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UNIVERSITY OF OREGON BULLETIN
NEW SERIES VOL. I NO. 4

Mineral Resources AND Mineral Industries OF OREGON

1903

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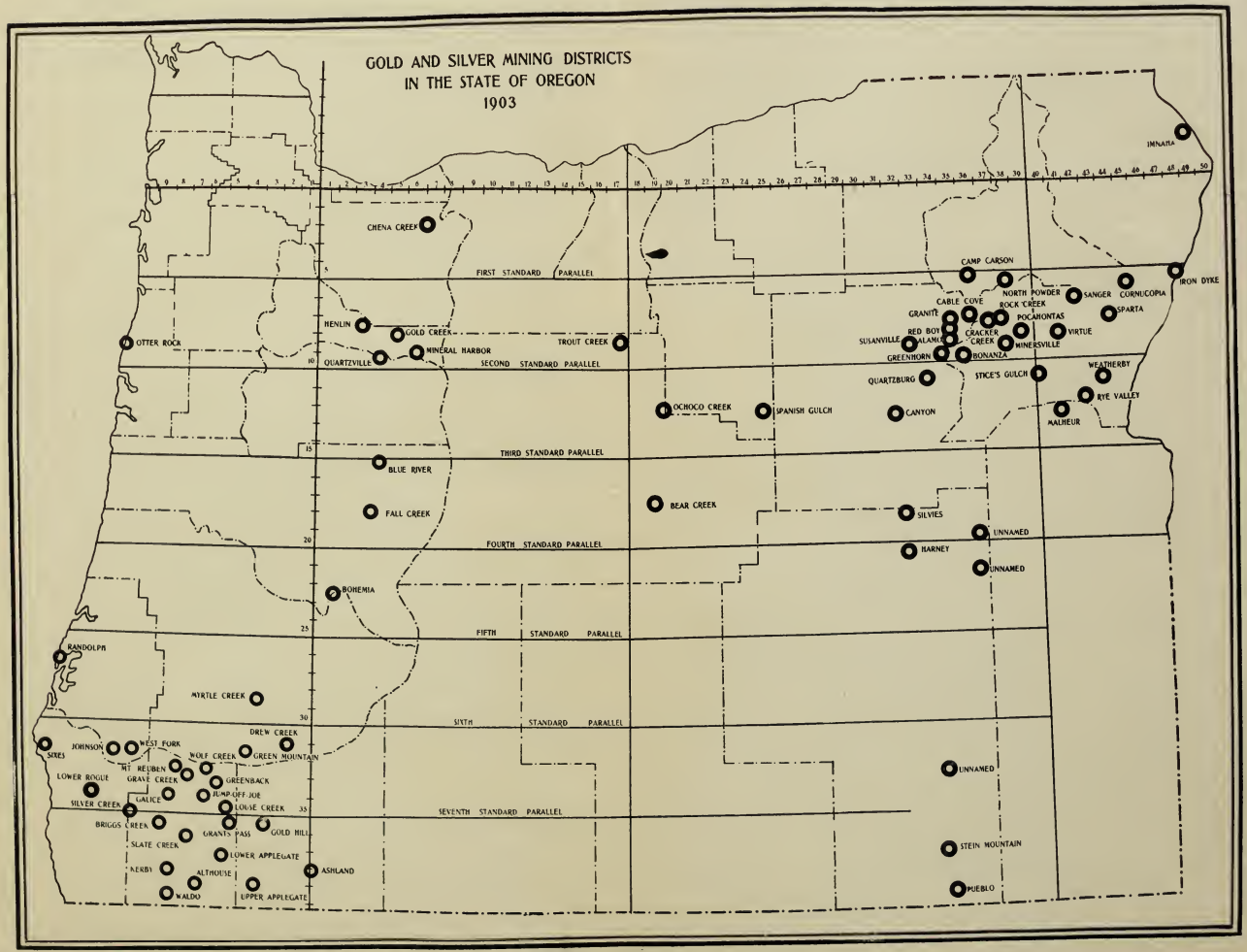
GOLD AND SILVER MINING DISTRICTS
IN THE STATE OF OREGON
1903
IMNAHA
CHENA CREEK
FIRST STANDARD PARALLEL
CAMP CARSON
IRON DYKE
NORTH POWDER
SANGER
CORNUCOPIA
CABLE COVE
ROCK CREEK
SPARTA
GRANITE
POCAHONTAS
HENLIN
GOLD CREEK
CRACKER CREEK
VIRTUE
OTTER ROCK
MINERAL HARBOR
TROUT CREEK
SUSANVILLE
RED BOY
ALAMO
MINERSVILLE
QUARTZVILLE
SECOND STANDARD PARALLEL
GREENHORN
BONANZA
WEATHERBY
QUARTZBURG
STICE'S GULCH
RYE VALLEY
OCHOCO CREEK
SPANISH GULCH
CANYON
MALHEUR
THIRD STANDARD PARALLEL
BLUE RIVER
BEAR CREEK
FALL CREEK
SILVIES
UNNAMED
FOURTH STANDARD PARALLEL
HARNEY
UNNAMED
BOHEMIA
FIFTH STANDARD PARALLEL
RANDOLPH
MYRTLE CREEK
SIXTH STANDARD PARALLEL
DREW CREEK
SIXES
JOHNSON
WEST FORK
GREEN MOUNTAIN
WOLF CREEK
MT REUBEN
LOWER ROGUE
GRAVE CREEK
GREENBACK
JUMP-OFF JOE
SILVER CREEK
GALICE
LOUISE CREEK
UNNAMED
SEVENTH STANDARD PARALLEL
BRIGGS CREEK
GRANTS PASS
GOLD HILL
SLATE CREEK
LOWER APPLEGATE
STEIN MOUNTAIN
KERBY
ALTHOUSE
ASHLAND
WALDO
UPPER APPLEGATE
PUEBLO

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THE MINERAL RESOURCES AND MINERAL INDUSTRY OF OREGON

For 1903

COMPILED BY THE
DEPARTMENT OF CHEMISTRY
UNIVERSITY OF OREGON

UNIVERSITY OF OREGON BULLETIN
NEW SERIES VOL. I NO. 4

Published by the University, Eugene, Oregon. Issued Bi-Monthly
MAY, 1904

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INTRODUCTORY NOTE

In presenting herewith an account of the mineral industry of Oregon the author, in justice to the subject and himself, feels the necessity of explaining the exact nature and scope of the work undertaken. An ideal discussion of the mineral resources of a country would involve, perhaps, an historical account of the mining industry in the several districts; a study of geological features; details descriptive of development, equipment, mining and metallurgical practice; statistics of production and labor; as well as whatever other matters there might be which would have either an economic or scientific bearing upon the industry in question. The complete attainment of such an ideal, however, would be the task of a thoroughly organized geological survey, adequately equipped, liberally supplied with funds, and properly invested with the authority necessary for carrying out its purposes. Even under such advantageous circumstances, in a state as large as Oregon, there would be some difficulty in making a complete statement of conditions before several years of work were done.

It became an absolute necessity for the author, therefore, in taking up this work single-handed, to set a limit within which it might be possible to accomplish something in the time at his disposal. With the means at hand the possibilities resolved themselves into a consideration of the places of occurrence of the various mineral deposits as far as knowledge could be obtained of them; their mineralogical character; ownership; development; and equipment. Nor has it always been possible to get all of this information with respect to a given property, in such cases there has been given simply a statement of the facts obtainable. It is thought that all of the more important, known mineral deposits of the state have received mention. In case any have been omitted it is because through the channels of information available for this work nothing has been heard from them.

It is the desire of the writer to acknowledge here the hearty cooperation which has been accorded him by many persons in all parts of the state. Credit is especially due to Mr. W. B. D. Dodson, of the Blue Mountain American, Sumpter; Mr. Frederick R. Mellis, Mr. Herbert Moulton, and Mr. V. V. Sparks, of Baker City; Mr. Edward S. Van Dyke, Mr. Dennis H. Stovall, Mr. H. C. Perkins and Mr. W. H.

Hampton, of Grants Pass; Mr. Frank J. Hard, of Bohemia; Mr. C. B. Watson and Mr. M. F. Eggleston, of Ashland; Mr. W. E. Coman, of Portland; Mr. C. J. Owen, of the Evening Telegram, Portland; Mr. W. B. Dennis, of Blackbutte; Mr. C. W. Washburne, of Eugene; Mr. B. W. Rice, Boise, Idaho; and Mr. J. J. Baker, Barite.

University of Oregon,
Department of Chemistry,
February, 1904.

O. F. STAFFORD.

ANTIMONY

This substance occurs as tetrahedrite and stibnite in association with the base gold ores of the state, especially in Eastern Oregon and in the Trout Creek mines of Crook County. It is not recovered in commercial quantities.

ASBESTOS

Asbestos is reported as occurring in the following localities, though in none of them, so far as can be ascertained, is there any actual production: Bumcomb, Kubli, and Spikenard, Jackson County; Browntown, Josephine County; Meadow, Lane County; Drewsey, Harney County; Mount Vernon and Prairie City, Grant County; Lakeview, Lake County; Barite, Wheeler County; Watson and Ontario, Malheur County; Canyonville, Perdue, Starveout, and upon Cow Creek, Douglas County; and upon the headwaters of the Clackamas River.

Specimens of the Jackson County product in the University collection show it to be a fair quality of the amphibole variety, the fibers in some cases, notably in the specimen from Spikenard, being several inches in length. The Starveout deposits are upon Evans Creek, twenty-six miles from the railroad and five miles from the wagon road. Three claims are owned by Curtis Bros., who have built trails and developed their property by open cuts. The veins are said to be not large but sufficiently numerous and close together to make the properties of value. The specimen from Browntown is rather better than a third grade quality. The owners of the Meadows deposit have given no details of development; the sample submitted seems to be chrysotile with short fibers. The Douglas County deposits occur in serpentine and closely related formations, thin stringers with but little permanence being the nature of the deposits as far as known.

BAUXITE

No authenticated reports of the existence of this mineral in commercial quantities in Oregon have come to our knowledge. A deposit said to be bauxite, found upon the Clackamas River, seems to be a ferruginous clay.

BORAX

Although borax occurs in Oregon to a considerable extent, all efforts to get into communication with the people interested in it in order that information for this work might be secured, have been fruitless. The following account of the industry is abstracted from the several volumes of the Mineral Industry in which mention is made of it:

The deposit is located in the marshes south of Lake Alvord, Harney County, and extends over 10,000 acres. With transportation facilities as they are at present about one-fourth of this area is rich enough to pay for working. The product is shipped by mule teams to Winnemucca, Nevada, 150 miles distant. The ground is level and treeless, and is incrusted with a layer of salts six inches thick,—sodium carbonate, sodium sulphate, and sodium chloride being constituents of the crust along with borax. During the long, dry summers this material is shoveled up, dissolved in boiling water to which sulphuric acid is added, the solution decanted, and the boric acid obtained by precipitation as the liquor cools. From five to twenty per cent of the raw material is borax. Four hundred tons per year was reported for the years 1898, 1899, 1900, and 1901. No production in 1902. The Rose Valley Borax Co. owns the richest of the marsh land. The deposits are renewed each year during the winter rains. Hot springs carrying borax are the reputed source of the mineral.

An interesting deposit of colemanite occurs five miles north of Checto, Curry County, the mineral being in compact layers and concretionary forms lying between beds of slate and steatite. It is said that shipments were formerly made to San Francisco, but nothing has been done with the deposit of late years.

CEMENT

There are probably many deposits of material within the state that will serve for the manufacture of cement of the various kinds, but until chemical analyses or practical tests of the numerous limestones, marls, and tuffs reported as suitable for this purpose can be made, it must remain a matter of conjecture as to what the possibilities for this industry in Oregon really are.

Tests have been made upon materials from only a few localities:

The Oakland limestones and Wilbur tuffs of the Roseburg quad-

rangle have been submitted to practical tests with results that at least make the owners of the deposits optimistic regarding the suitability of these substances for cement manufacture. On the farm of A. F. Brown, six miles south of Oakland, a deposit, probably a tufflentil, has been developed by a shaft 10 feet deep, material from which has been shipped to Oregon City and roasted. Mr. Brown says that he has seen stone made from it superior to that produced by Portland cement. The following is an analysis of a sample of this tuff taken by J. S. Diller in the course of his geological survey of the Roseburg quadrangle, and analyzed in the laboratories of the Geological Survey at Washington:

Silica	55.15
Carbon dioxide	3,64
Titanium dioxide, Phosphoric acid, Alumina	9.75
Ferric oxide	7.76
Lime	10.48
Magnesia	2.22
Potash	.50
Soda	1.00
Water loss at 110°	2.70
Water loss above 110°	6.59
Total	99.79

Another deposit similar to this which has been exploited slightly is nine miles west of Oakland. From Diller's report it is seen that the Wilbur formations are of small thickness, and that their extent is limited to a line about 13 miles long extending from the neighborhood of Wilbur northeast to the Calipooia Mountains. The Oakland limestones are of even less extent, only three small areas, with less than an acre in each, having been observed by Diller.

Through the kindness of Messrs. Sibley and Eakin, of Dallas, the following analysis of the rock from the Dallas quarries is available. The analysis was made at the Agricultural College of Michigan:

Total silica	24.08
Aluminum and iron oxides	15.66
Lime	31.58
Magnesium oxide	2.74
Water loss at 105°	3.56
Carbon dioxide	20.24
Undetermined	2.14

The quarries are about two miles west of Dallas, and cover several hundred acres. The stone has a fine blue color, is of good texture, and extensively used for building. It is one and one-half miles from the railroad,—the estimated cost of building a spur to the quarries being $18,000.

Five miles east of Monitor, Marion County, is a ledge of argillaceous limestone which crops at intervals for twelve miles or so to the south of the point named. Its burned product was used in the construction of the Oregon City woolen mills, it is said, and also in the building of the Coolidge block at Silverton. It is not worked at present, nor are any analyses available. A sample in the University collection will be analyzed in due time. In Columbia County many occurrences of marl are reported which may prove to be valuable as cement making substances.

CHROMITE

No extensive deposit of chromite is known in the state. Small bodies of the mineral are of frequent occurrence and are wide-spread in their distribution, but in no instance that has been reported are quality and quantity found together. A sample submitted by Mr. P. L. Keeton, sheriff of Wheeler county, is the best that has come to the notice of the author. An analysis made in this laboratory shows the presence of over 49 per cent chromic oxide.

THE CLAY INDUSTRIES

Kaolin—Deposits of kaolin are found in the localities cited below, the names of persons interested being given in connection where possible:

Malheur County, 28 miles southwest of Huntington, B. W. Rice, Boise, Idaho; Arago, Coos County, Henry Schroeder; Wasco County, five miles above The Dalles; south of Harney Lake, Harney County, H. C. Perkins, Grants Pass, Oregon; ten miles east of Ashland, M. F. Eggleston, Ashland; Currinsville, Wm Marshall; mouth of Pine and Salmon Creeks, foot of Elkhorn range.

Fireclay—E. B. Simmons, Walker; O. G. Weaver, Berlin; Robert Archibald, Shaw; C. G. Caples, Columbia.

Brick and Tile—An abundance of clay for the manufacture of brick and tile seems to be at hand. Below is an incomplete list of the firms in the state engaged in this industry, together with occasional notes regarding equipment, clay deposits, production, in 1903, etc.

Aims, Herbert Culpin.

Albany, Chamberlain Bros.—Wilson and Kitchen.

Ashland, W. J. Branner.—C. H. Vechte.

Aurora, Jacob F. Yost; brick and tile.

Banks, Jos. Schneider.

Bay City, B. Provost and Son.

Carson, Hulse Bros.; tile.

Central, Randles and Kinsey; 2,500,000 common brick in 1903.

Chemawa, F. J. Beatty.

Cottage Grove, Wallace and Sons.

Condon, C. Armstrong.

Corvallis, W. C. Corbett.

Dairy, Klamath County, C. C. Pearson.

Dallas, C. S. McDevitt.—Geo. F. Shew.

Elgin, Peter Book.

Eugene, J. M. Martin; 400,000 common brick in 1903.

Florence, William Brund.

Forest Grove, Albert Dixon.—B. F. Ketching; 800,000 common brick, 20,000 pressed brick in 1903.

Gervais, Benjamin Mench.—J G. Martzolff; clay said to be very fine; 400,000 made by hand during 1903; yard will be equipped with improved machinery having a daily capacity of 30,000 brick.

Gold Hill, Walter Stickel.

Grants Pass, James Carter.—Colvin Bros.

Grass Valley, Henry Patterson.

Greenleaf, Herman H. Steinhauer.

Hillsboro, J. H. Sewell; brick and tile.

Hubbard, I. S. Miller; brick and tile.

Independence, J. R. Cooper; brick and tile.

Kinton, Landess and Brown; 87,000 ordinary brick; 121,640 drain tile; 6000 hollow building blocks in 1903; 40 horse power Acme Special machine; 15,000 feet floor space; 15,000 feet kiln space.

LaGrande, LaGrande Brick and Tile Co.

Lakeview, Moses Striplin.

Langlois, E. Bossen.

McMinnville, Jacob Seiters and Son.—Heath and Swan, tiling; two 16 foot down draft kilns; two sheds 100 feet long; 40-horse power engine.

Marshfield, C. W. Laughead.

Meacham, W. B. Ross.

Medford, Childers Bros.

Merrill, Klamath County, George Vaughn.

Milwaukee, Charles Fisher and Co.

Monmouth, James Hetmick; tile.

Moro, B. F. Hoover.

Mt. Angel, Butsch and Schorms; 320,000 common brick.

Myrtle Point, Sam Giles.

Newberg, James H. Hammett and Sons; fire brick, 5000; common brick, 350,000; repressed, 8000.—Newberg Pressed Brick and Terra Cotta Co , Jesse Edwards, president. This is the only dry pressed brick plant in the state. Twenty to thirty cars of clay a year are shipped from Buena Vista, Oregon, and about 100 cars per year from Willamina,—the two kinds making it possible to manufacture any shade of brick from pure white to a dark brown. Bronze medals were awarded this firm at Buffalo and Omaha, and a silver medal at Charleston. Plant represents an investment of $50,000. Output in 1903, 1,075,000 brick; 250 tons of fireclay sold; 40 tons ground brick dust sold.—J. F. Taylor; product in brick and tile valued at $1000.

North Yamhill, Phil Withycomb; clay bank only; 1000 tons in 1903.

Oakland, Johnson and Williams; brick and tile.

Ontario, Wm. Schimp.—David Wilson.

Portland, James Anderson.—J. C. Bayer.—Diamond Brick Co.—L. E. Kern.—F. L. Litherland and Co.—The J. McCracken Co.—Peter Van Hoomissen.—Versteeg Bros.—Western Clay Co. The last named company obtains its clay from near the site of old Fort Clatsop, on the Lewis and Clark River, and from Harlow, Blasa, and Harlow, at Troutdale.

Prairie City, Thos. Walsh.

Prineville, D. W. Hardin and Sons.

Riddle, J. H. Summers.

Roseburg, Micelli Bros.

Salem, A. A. Burton.—Jos. Murphy.

Scholls, Groner and Rowell Co.; 100,000 brick; 200,000 tile; 20,000 hollow building blocks.

Sylvan, J. W. Cooke; 900,000 ordinary brick in 1903.

Terry, John Bliss.

Toledo, M. Glass.

Warren, Ero Wambeck.

Wasco, B. F. Hoover.

Weston, Clark Nelson; 4,000,000 common brick, 100,000 pressed brick in 1903.

Whitney, W. B. Wren.

Whitson, S. McAlister.

Woodburn, Andrew Dawson,

COAL

THE COOS BAY FIELD

The Coos Bay deposits of coal occur in the vicinity of Marshfield, a town located at the head of Coos Bay, in township 25, range 13 west. The area is described by J. S. Diller in the Coos Bay Folio,— No. 73 of the U. S. Geological Survey,— and in a paper, "The Coos Bay Coal Field," 19th Annual Report of the Survey, part III. As defined in these works the coal area covers about 150 square miles. Additional areas have been reported to the author, however, within the past few weeks, by Mr. J. H. Timon, of Timon, Oregon, and Mr. Carl L. Albrecht, of Marshfield. The area discovered by Mr. Timon is said to be twenty miles long and of unknown width,—details of location not given. Those reported by Mr. Albrecht are as follows: The Ten-Mile basin, sections 4, 5, 6, 7, 8, 17, 18, township 23, range 12 west; the South Coos River basin, township 24, range 9 west; the Eden basin, township 32, range 11 west.

The coal is lignite of good quality, and non-coking as a rule. The following analytical data published in Diller's Geological Reconnaissance in Northwestern Oregon are taken from 14 analyses by different analysts:

Moisture, 4.05 to 17.27 per cent; average 9.45.

Volatile matter, 41.00 to 48.30 per cent; average 43.46.

Fixed carbon, 32.40 to 44.91 per cent; average 36.43.

Ash, 3.00 to 12.81 per cent; average 7.08.

Sulphur, .45 to 2.55 per cent; average 1.24 per cent.

The coal beds occur in well defined "basins," some of which are at an elevation of as much as 200 feet above sea level, with consequent advantages in the way of accessibility, drainage and gravity delivery to tide level. Others are below sea level, and mining is as a result more expensive. In the different basins, the thickness of the coal bearing strata varies, there being but a single bed in the Newport basin, while at other places as many as six beds, aggregating 30 feet in thickness, are distributed over a vertical distance of 600 feet.

Mining has been in progress in this district since 1855, the product being shipped by schooners to San Francisco. An average production of 50,000 tons—which is considerably less than the present output—was long maintained. The district is reached by steamer from Portland or San Francisco, or by stage leaving the Southern Pacific railroad at Drain or Roseburg.

Beaver Hill Mine—Owned and operated by J. D. Spreckels and Bros., San Francisco. It is situated about 15 miles from Marshfield at Beaver Hill, upon the line of the Coos Bay, Roseburg, and Eastern railroad, this line bringing the coal from the mine to the bunkers at Marshfield. The property has been worked for about ten years, in which time the main slope has been carried about 2000 feet. Three hundred miners are employed in mining and development; daily output estimated to be 175 long tons; yearly output 75,000 long tons. W. S. Chandler, Marshfield, manager.

Libby Mine—Goodall, Perkins and Co., San Francisco, owners. A narrow guage railroad brings the product to Marshfield, a distance of three miles. The mine has been operated continuously for over fifty years. It employs about 150 men; daily output 150 long tons; estimated yearly output 45,000 long tons; 20,000 feet of development tunnel. P. Hennessey, Libby, Oregon, manager.

Crescent Mine—This mine is located at Maxwell, on Isthmus Slough, about six miles from Marshfield. Coal is shipped direct from the bunkers at Maxwell. Employs about 100 men in mining and development. Daily output at present is about 50 tons, but within a few months it is expected that the product will be at least 100 tons per day. Development has been very active at this property for the past two years. Slope is now down 300 feet; a rock tunnel is started to tap an upper vein; and work on breaker has commenced. P. E. C. Burke, Marshfield, manager.

In addition to the above, the following are undergoing slow development, and with proper financial backing will become large producers:

South Marshfield mine, South Marshfield; Flanagan mine, one mile west of Marshfield; Lillian Mine, on Coos River, six miles east of Marshfield. The last is said to have an eleven foot vein of coal.

The Henryville mine at Henryville, the Westport mine at Westport, and the Glascow mine at Glascow, on Coos Bay, have all been worked more or less, but are now closed down. They all have good veins of coal but have ceased operations in most cases from lack of capital to develop them properly. The Henryville mine is owned by the Southern Pacific Company, and has an excellent vein which is well developed. It is supposed that the discovery of coal in the Black Hills of California caused the shutting down of this mine.

Coquille Coal Co.—Located at Riverton on the Coquille River. Opened by an incline of 800 feet. Seven distinct veins said to be upon the property. No details of operations during the present year are given.

Little can be said at present regarding the newly reported coal areas mentioned above. It is the opinion of Mr. Timon that the deposit found by him is the largest and best strike made upon the coast up to the present time. Eleven veins, varying from thirty inches to nine feet in width, are so located that a 500-foot adit will cut them all. The quality of the coal is said to be superior to that found elsewhere in the region.

COAL IN THE YAQUINA FIELD

No coal mines are now in operation in this field. It has been extensively prospected, with the result, according to Diller, that the coal beds are shown to be altogether of a local character. Mr. B. F. Jones, of Toledo, writes that the Toledo Coal Co. did considerable prospecting several years ago with the result that a surface ledge three feet thick was opened up, and an eight foot ledge discovered by drilling to a depth of 100 feet. After building 400 feet of tunnel to crosscut the big vein, the company became financially involved, and ceased operations before reaching its objective point. This work was done three miles north of Toledo, upon Depot Slough. There are extensive coal beds lying north of Toledo for a distance of ten miles, and coal croppings of from one to two and one-half feet thickness have been found within a radius of four miles. No development or prospecting has been done, however, for the reason that this territory is included within an Indian reservation.

LOWER NEHALEM COAL

Deposits of coal are found upon Coal Creek and upon a branch of Hodge Creek, all in township 3 north, range 10 west, in Tillamook County. No developments of note are reported. The coal is said to be hard and lustrous. The maximum width of the veins is 30 inches.

UPPER NEHALEM COAL FIELDS

These lie in Columbia County and, according to Diller, extend for 13 miles from northeast to southwest with a width of from one to two miles. The northeastern terminus of the belt is section 27, township 5 north, range 3 west; the southwestern terminus is in section 34, township 4 north, range 4 west. Exposures are said to be upon Pebble Creek, the east fork of the Nehalem, and upon Clatskanie Creek.

The largest outcrops are upon Pebble Creek, and more develop-

ment work has been done here than elsewhere in the district. There are several beds exposed which vary from a few inches to ten feet in thickness. The coal is a lignite, but in many of the beds hard and lustrous. An average of three analyses gives in round numbers the following percentages: moisture, 10.80; volatile matter, 42.; fixed carbon, 32.; ash 14.; sulphur, 3.60.

Upon the Nehalem two veins have been discovered, the larger of which is five feet thick.

According to Mr. C. G. Caples, of Columbia, the occurrence of coal is not confined to the strip defined by Mr. Diller. The localities cited by Mr. Caples are not definitely assigned, however, so that an exact comparison is not possible. He mentions a deposit five feet thick one mile west of the Columbia,—clean, hard lignite; while another mile west, the same vein crops again, and has been prospected by 20 feet of tunnel. Ten miles to the south lignite of about the same quality and in the same amount crops upon the North Scappoose. Another bed is mentioned as occurring at the mouth of Oak Ranch Creek upon the Nehalem River; Rock Creek, tributary to the Nehalem, also carries coal. In Mr. Caples opinion the coal compares favorably in all respects with the Puget Sound product.

COAL BETWEEN THE CASCADES AND THE COAST RANGE

Indications of coal are reported at numerous places within the territory bounded by the Cascade and Coast ranges. The Upper Nehalem and other Columbia County fields belong in it, and at the present time are probably the most promising. Many of the deposits of which notice has been given are doubtless mere indications, or at any rate not enough development has been done upon them to justify even an enumeration of their places of occurrence.

Clackamas County—In the south half of section 27, township 3 south, range 5 east, is a bed of lignite 18 inches thick. Croppings of the same character occur five miles to the south. F. M. Gill, Garfield, Or.

A four-foot bed is said to occur near Wilhoit Springs.

Marion County—In township 8 south, range 1 east, a six foot vein is reported which is being exploited by R. Archibald and W. Nichol, of Shaw.

Mr. L. H. McMahan, of Salem, prospected with a diamond drill upon the Blair-Forward farm, in the Waldo Hills, ten miles east of Salem. A basaltic formation was encountered at 850 feet, upon which the effort there was abandoned. The formations consisted mostly of sandstone, soapstone and slate, with thin strata of imper-

fect lignite. Another hole was drilled, a half mile to the east, which penetrated to a depth of two hundred and fifty-three feet,—eight feet of imperfect coal, shale and slate being encountered. Between these two holes four feet of fair lignite is found, but it is Mr. McMahan's belief that the deposit is purely local.

Lane County—A deposit near Creswell, 14 miles south of Eugene, is probably the most important one known in the county at the present time. Others have been reported from the foot-hills of the Coast Range.

Yamhill County—The Portland Coal and Development Co. is opening a ledge near North Yamhill. The mine, which has been worked for a year, has a tunnel system 1500 feet in extent, giving 700 feet horizontal depth and 400 feet vertical depth.

Douglas County—From the Roseburg Folio of the U. S. Geological Survey it is learned that coal occurs upon the north fork of the Umpqua, upon Little River and Cavitt Creek, and upon Coal Creek,—all in the eastern border of the quadrangle. An analysis of Cavitt Creek coal is as follows: Moisture 4.61 per cent; volatile matter, 38.54; fixed carbon, 39.00; ash 17.80; sulphur .44.

East of Oakland a deposit is reported in section 9, township 24, range 3 west.

Mr. Albert Abraham, of Roseburg, is interested in a deposit of coal in section 16, township 23, range 8 west. The entire vein measures nine feet four inches in width, but is not homogeneous. The following is an analysis made by Mr. V. V. Sparks in the University laboratory: Moisture, 3.78 per cent; volatile 41.58; fixed carbon, 43.48; ash, 11.15; sulphur .57.

A three foot vein of coal is said to be at Camas Mountain, township 29, range 8 west; another deposit is reported upon Smith River; in section 15, township 27, range 7 west, is also a small seam,—all of these being mentioned in Diller's Geological Reconnaissance in Northwestern Oregon.

Jackson County—Coal is reported in the vicinity of Eagle Point, but the most promising deposit in the county is found upon Evans Creek in section 21, township 33, range 2 west. A vein 11 feet four inches in thickness is developed by a slope 60 feet deep. Coal is said to be free from sulphur and silica. Major D. R. Andrus, of Medford, is familiar with the deposit.

COAL IN EASTERN OREGON

The only known deposit of importance in Eastern Oregon at the present time is that of the Heppner Railroad and Coal Co., located

20 miles south of Heppner upon Willow Creek. About 5000 acres of coal land is owned by this corporation, as well as the right of way for a railroad from Heppner to the property. The coal is lignite, a reputed analysis of which is as follows: Moisture, 1.26 per cent; volatile matter, 33.20 per cent; fixed carbon, 54.74; ash, 9.70; sulphur, 1.00. It is said to be hard enough to ship well, and has been given a practical test by the O. R. and N. company which has demonstrated its value as a steaming coal. A considerable quantity of coal is blocked out by the development work, and awaits the completion of transportation facilities.

It is asserted that coal underlies the whole country between The Dalles and Heppner, and some prospecting with drills has been done during the past year to demonstrate the truth of the belief. Near The Dalles, a diamond drill has penetrated to a depth of a thousand feet or so, in the course of which, it is stated, a bed of lignite 11 feet in thickness was passed through. Mr. P. L. Kretzer, of The Dalles, has had this work in charge.

Coal prospects are reported at other points in the John Day valley, but no developments have been made, and detailed information concerning them seems difficult to get.

In many other localities east of the Cascades, traces of coal are reported, but at the present time nothing definite can be said concerning them.

COBALT

The occurrence of cobalt is confined almost entirely to the Standard Consolidated mine at Quartzburg, with the description of which an account of the cobalt produced there is given.

Traces are reported from other localities, but in no instance in commercial quantities. In the neighborhood of Kerby, Josephine County, float specimens of what is probably erythrite are found.

COPPER

Copper in Oregon occurs for the greater part associated with gold and silver, and has therefore been discussed simultaneously with those metals. The main copper bearing localities are the following: Imnaha district, Iron Dyke district, North Powder district, Quartzburg district,—all in eastern Oregon; Dodson Butte, and Upper and South Umpqua, Douglas County; and in the Coast Range Mountains of Curry and Josephine counties.

In the Waldo district of the last locality named is probably the

most distinctly copper-bearing area in the state. The properties there which have received the greatest amount of development are those of the Waldo Smelting Co., and are said to have a large quantity of good ore blocked out awaiting better transportation facilities. This company under a different name,—The Oregon and Pacific Railway Construction Co.,—has surveyed the right of way for a road to extend from Grants Pass to Eureka, Cailfornia. Col. T. Waln-Morgan Draper, of San Francisco, is at the head of the enterprise.

The Mountainview Mine—Owned by the Vulcan Smelter Co., has a copper proposition opened up by several hundred feet of tunnels and drifts.*

The Queen of Bronze has a ledge four to eleven feet wide opened by a shaft 110 feet deep and by drifts. A steam hoist is a part of the equipment. Mr. J. P. Murphy is in charge.

GOLD AND SILVER

These two metals occur together in almost every case, and so will be discussed simultaneously. The productive areas are found in the Blue Mountain region of the eastern part of the state; intermittently in the Cascades for practically their whole length in Oregon; and in the mountainous region of the Southwest. In small quantities gold and silver may be found most widely scattered, there being very few places in the state not covered by recent lava flows which will not yield traces of these metals. The flood plains of many of the rivers in Oregon are composed of material carrying small values,—too small, unfortunately, in many cases, it must be said, to pay for extraction by any of the methods in use at present, but which will in time, it is hoped, be recovered at a profit. The difficulties incident to saving the gold from the sands of the Snake, and the beaches of the western coast, which are typical cases of the kind, are treated at length in the various publications of the Geological Survey, in the Mineral Industry, and many other places. When the problem is finally solved untold millions must result as a consequence of the working of such deposits. Besides these, however, there is much virgin ground which would even now pay handsomely for intelligent exploitation by dredging and similar methods. Other districts are known, too, in which it is supposed that vast low-grade deposits of

*Upon the lower Illinois copper deposits also occur, frequently showing masses of native metal of considerable size.

auriferous quartz occur, but which must lie idle, undeveloped even, until problems of transportation are solved which will make them commercial possibilities.

THE DISTRIBUTION OF PLACER GOLD IN OREGON

(Contributed by C. W. Washburne.)

In Oregon placer gold is limited to areas of the older rocks or to their vicinity. This means to pre-Jurassic rocks in the Blue Mountains, and to pre-Tertiary rocks in Southwestern Oregon. Of course the streams from these areas carry fine gold even to the sea, and it may be detected in their gravels and sands at many places to so great an extent, indeed, that in sea beaches two hundred miles from old rocks flour gold is so plentiful that it is supposed to contain fortunes for those who will find a way to save it. But stream gold which can be saved by methods now in use and in paying quantities is limited to the vicinity of old rocks. This is not a theory but a fact observed during several years of field work in the placer districts of Oregon and during numerous reconnaissances in the Coast and Cascade Ranges. It may be clearly seen by picking out the placer mines on Lindgren's map of the Gold Belt of the Blue Mountains*.

The reason for this distribution is not hard to find. The later rocks in the Blue Mountains do not contain much gold. The workable veins of the region are in Triassic or in Paleozoic rocks. Gold coarse enough and abundant enough to be worked with profit, can therefore not be found in the stream beds where these rocks are covered for any considerable distance by later lavas or sediments. The same reason applies to Southwestern Oregon, except that in this region mineralization continued through the Lower Cretaceous (Knoxville) and probably into the Upper Cretaceous (Chico), but did not continue thereafter, or at most only feebly. In both regions secondary enrichment may have continued to the present day, but primary deposition ceased at the times mentioned.

This explanation is not entirely sufficient, however. That the presence of gold bearing deposits in the rocks does not mean the presence of workable placers in the streams is evident from a study of the Cascades, though of course the absence of gold in the rock of any region must always result in the absence of placers. In the Cascades of Oregon and Washington there are many quartz veins which yield paying quantities of gold. The gold is in Tertiary rocks, and its deposition has continued almost to present time. In this case the

*Twenty-second Annual Rept. U. S. Gol. Surv., Part II, Pl. LXIV.

absence of paying quantities of gold in the stream is due to the slight amount of erosion which the ore bodies have suffered. Since the late Tertiary the canyons of the Cascades have been cut, and in some cases divides have been worn to sharp ridges. More often the dividing ridges are broad and along their summits have approximately the surface of the last lava flows that did not enter the present canyons. In other words, erosionhas been slight, being limited to the cutting of the valleys and canyons of the range. The scarcity of stream deposits among the lavas and tuffs of the range shows that previous to the cutting of the present canyons the piling up of volcanic material greatly exceeded erosion. Hence at that time veins were more likely to be covered than to be worn down by weathering.

In the Blue Mountains and in the Klamath Mountains*, on the other hand, there has been great erosion since the deposition of the ores. The erosion of the crumpled pre-Jurassic rocks of the Blue Mountains probably amounts to many thousand feet vertically. The erosion of the pre-Tertiary rocks of the Klamath Mountains must have been almost as great, as Mr. Diller† has found evidence that these mountains were once covered by a heavy mantle of Cretaceous strata which has since been almost entirely stripped off. The latter region has been worn down to sea-level, and elevated for recutting into its present form, since the deposition of the gold ores. This erosion, to which that of the Cascades is insignificant, has resulted in the breaking up of millions of tons of gold ore, the streams concentrating most of the gold therefrom within a short distance from its source.

It is a natural deduction from these two arguments that valuable placers will never be found in the Cascades south of central Washington,n or in the Coast Range between the Olympic Mountains and the Klamath Mountains.

BEACH GOLD AND ITS SOURCE

(Contributed by Mr. C. W. Washburne.)

The Oregon coast has many deposits of black sand, but they furnish paying quantities of gold in but very few places. The sand is abundant from beyond the California line to Long Beach, in

*Klamath Mountains is the name given by the U. S. Geological Survey to the mountains of Southwestern Oregon and Northwestern California comprising the Siskiyous and part of the Rogue River Mountains in Oregon, and the Salmon, Trinity and other mountains in California. They are composed of pre-Tertiary rocks and hence include all the gold deposits of Southern Oregon.

†Bulletin Geological Society of America, vol. 4, p. 214.

Washington, and will give tests for gold at any place. But no miner has yet found a practicable means of working the sands farther north than the mouth of Big Creek, in Lane County,* where in 1902 the writer found Mr. William Reynolds saving about two dollars a day by working between tides with a rocker. Mr. Reynolds also showed the writer a vial containing about three ounces of platinum which he had saved in a winter's work. Mixed with the platinum was another white substance, probably iridosmine, which constituted about one fifth of the mass.

South of the above place gold has been mined along the beach at innumerable places. At the mouth of Rogue River there are some beach mines that were once among the richest placers of Oregon. The discoverers of the deposits just north of the mouth of Rogue River found it exceedingly profitable to mine them, even though for lack of horses, it was necessary to hire men to carry the black sand on their backs to the top of the terrace back of the beach where running water could be had for washing out the gold. This was in the sixties. Since then these sands, as well as those near Gold Beach, across the river, have been practically exhausted, being worked today in a most desultory way.

The source of gold in the beach sands is an interesting problem. Miners along the beach believe it has been brought down by streams from backlying parts of the Coast Range, and concentrated on the shore by the waves. They argue that the presence of black sand in these streams supports their view, but this black sand, which is mostly magnetite, occurs in nearly all the rivers of Oregon which have basalt or other basic igneous rocks on their drainage, and rarely contains more than a trace of gold. In the Coast Range it is not known to contain platinum or iridosmine, which are nearly always associated with the beach gold.

We must therefore conclude that the gold has been transported along the coast from the north or from the south. We have already noted the fact that the gold is too fine or scarce in the black sands from Long Beach to the coast of Lane County to be successfully worked. We have also noted that the richest sands are at the mouth of Rogue River. South of this stream the sands are not rich and have never been worked beyond the Klamath River. By examining a map of Oregon it may be seen that all the spits at the mouths of rivers point northward, indicating that the movement of sand is in that direction. In the gold-bearing sands and elsewhere along the

*Reports have been received from Mr. B. F. Jones, of Toledo, who is successfully working a beach deposit at Otter Rock, Lincoln County, which is north of the point indicated by Mr. Washburne.—AUTHOR.

beaches are small, bright colored strips of sand which owe their color to garnet or epidote, minerals unknown in the Coast Range but common in the Klamath Mountains of Southern Oregon. The conclusion is that the gold-bearing sands have been driven by the waves from southern Oregon, and that Rogue River has been the most important stream in taking this gold to the sea from its original resting place in the rocks of the Klamath Mountains.

DREDGING OPERATIONS IN OREGON

The scene of greatest activity in dredging operations in the state so far has been upon Snake River, the bars of which, for practically the entire length of the stream, carry values in gold. The metal occurs in very thin scales, several hundred colors sometimes being required for one cent in value. The problem of saving such gold is a vexing one, and numerous devices have been proposed having this purpose in view. Some success has been achieved by the use of burlap in the sluices, in conjunction with copper plates for amalgamation. Discussions of the manner of occurrence of the gold, together with accounts of dredging practice, are to be found in Lindgren's article in the Twenty-second Annual Report of the Geological Survey, part 2, page 759; in the Mining and Scientific Press, December 29, 1900; and in the several volumes of the Mineral Industry.

Inquiries into the status of the industry upon Snake River for the year past brought reports from but a single dredge, though others are known to exist, and may have been in operation. The dredge in question has been working near Ontario. It is the property of the Moraine Mining Co., and has a capacity of 2000 yards of gravel per 24 hours. The gravels handled are said to carry 17 to 35 cents a yard.

The Pomeroy Dredging Co., of Portland, had a plant at work a few years ago in the bed of Burnt River, below Weatherby, Baker County. Difficulties in operation, presumably, brought about a cessation of operations.

A dredge seems to be a possibility in the near future for the Crane Flat placers, near the Cougar mine, Granite district.

On the John Day River, four miles below the town of John Day, the Empire Dredging Co., of Portland, is operating a large plant with notable success, according to all accounts. The dredge is of the bucket type, each bucket having a capacity of seven cubic yards. A 250-horse-power steam plant is used to drive the machinery. The gravels are said to contain 30 cents a yard.

In Southern Oregon a dredge is nearing completion upon Foots Creek, a tributary of the Rogue between Grants Pass and Gold Hill, the Champlin Dredging Co., of Chicago, being the owners. About 1200 acres of dredging ground has been made available in the Foots Creek basin by the building of a dam near its point of confluence with Rogue River. The hull of the dredge is 112 feet long, 37 feet wide and 8 feet deep. When loaded with its 175,000 pounds of machinery it will draw four feet of water. In its construction 225,000 feet of lumber was used. The elevated material first passes into a revolving screen by which the heavier wash is carried over the side, the finer being raised to sluices above, which are so arranged that they can be directed to any point from a right angle on either side to dead astern. The length of these sluices is 100 feet, giving a large area of dump. The dredging elevator is 81 feet long and has 42 buckets of eight cubic feet capacity each. A steam plant develops 150 horse power. The daily capacity is stated to be from 3000 to 4500 cubic yards. Cost of the plant is $60,000. It is expected that the dredge will begin operations within a short time.

Dredging operations are contemplated for the Sixes River, Coos County, where values in gold, platinum and osmiridium are to be saved; for Evans Creek, northern Josephine County; and for Bolan creek, tributary to the Illinois.

The dredging industry in Oregon is doubtless in its infancy, as many locations are yet available which can be made to yield profitable returns by this method of mining.

GOLD AND SILVER IN EASTERN OREGON

The most thoroughly developed mineral area of the state is situated in Baker, Union, Wallowa, Grant and Malheur counties within the territory covered by the Blue Mountains. Baker County is in the center of the area and contains a greater part of it. Only the outer edges of the mineral belt extend into Wallowa and Union counties on the north and into Malheur and Harney counties on the south. The belt extends intermittently to the west, however, as far as the Trout Creek district in Crook County

Eastern Oregon was quite active during 1903, and the close of the year marks a substantial advance in the general condition of things. A number of enterprises have been under way which will, if completed, do much toward solving the troublesome problems of transportation upon which the profitable working of many of the properties is contingent; the field of operations has been extended

somewhat; and much has been done in the way of weeding out tares, sowing new grain, and cultivating plants already growing or producing.

An event of significance in the district has been the completion of the Sumpter smelter. This enterprise was launched in the fall of 1902 and made its initial run in the last days of December, 1903. The furnace in this plant is a 38x140 Allis-Chalmers water-jacketed matting furnace with hot blast stove, and dust flue-chambers. An excellent sampling installation, together with briquetting machinery, steam power plant, electric lighting apparatus, storage bins, assay laboratories, administration buildings, etc., constitute adjunctive features. Dr. Edward W. Mueller is manager.

The Alamo District

The Alamo Mining district is situated twenty miles by stage road west of Sumpter. The town of Alamo is upon Clear Creek which near by receives two tributaries, Beaver Creek and Olive Creek. The territory adjacent to all of these streams is mineralized, while the gravels in their beds have long been worked for gold.

Alamo—The Alamo group consists of five patented claims located upon the ridge between Olive and Clear creeks. Developments consist in a crosscut 1300 feet to the vein at a depth upon the latter of 510 feet. Drifts upon the vein on this level have been carried some 500 feet, giving a vertical depth of 800 feet. Tunnel No. 2 upon the vein has 1400 feet of work. Tunnel No. 1 is near the top of the hill. Developments show a continuous vein 19 to 25 feet in width, with free milling ore in the upper parts at least. In May a 10,000-feet capacity saw mill was installed, together with a water power plant to utilize the water from Clear Creek. Later a building for a 20-stamp mill was erected, and ten stamps and six concentrating tables installed. Stamps were dropping in this plant the last of December. J. P. McGuigan is in charge.

Olive Creek Placers—These placers are located in Olive Creek above Alamo. The creek bed is said to be wide and the gravels deep, but extensive operations have been impossible by old methods on account of lack of dumping facilities. The property is now in the hands of Killen, Warner, Stewart and Co., with D. T. McCoy in charge. It is equipped with two reservoirs, two and a half miles of ditch, and four giants. Two No. 1 giants and one No. 2 were operating all summer, and a large force of men has been employed practically all year,

St. Anthony—This property is located upon the south side of Clear Creek. A small development force has been at work most of the past year, during which time the main tunnel was carried to 1000 feet and then abandoned. A new tunnel started upon a parallel vein was in some 500 feet at last reports.

Little Giant—Situated six miles from Alamo, at the foot of Greenhorn Mountain. It was located in 1898 and promised to be a good property, but for various reasons has failed to materialize. In addition to other developments a crosscut to strike the vein at depth was driven 1600 feet, but then abandoned. No reports of work upon this property during the past year have been received.

Anderson Group—This group, sometimes spoken of as the Golden Fleece, is upon Beaver Creek, below Alamo proper. It has been developed lightly for three years, but in December was bought by I. W. Anderson and G. W. Boggs, of Tacoma, who are pushing further developments.

Scandia Tunnel Co.—This company is running a long crosscut tunnel to tap ledges cropping near the summit. Work has been in progress for three years and it is expected that it will be continued through the winter. The breast of the tunnel is now 2600 feet from the portal, giving a vertical depth of 600 to 700 feet. The main vein is supposed to be still ahead, though two or three small veins have been cut. The property is near the Quebec.

Strasburg Claim—On Olive Creek one mile above Alamo. One or two big veins are reported which are developed by 1200 feet of workings. A good ore body is claimed.

Quebec—Located upon the ridge between Clear Creek and Olive Creek three miles west of Alamo. It is developed by three tunnels which are in the aggregate 1500 to 1800 feet in length, and which prove a wide ore body. Late in 1902 a 10-stamp mill was erected to be operated by a 70-horse power steam plant. Four concentrating tables are included in the equipment. Early in the year several mill runs were made from ore in the upper workings. In July, the property was bonded to Detroit capitalists who are pushing operations.

Big Producer Group—Development work upon this property consists of a 500-foot crosscut tunnel on the Moulder Boy claim, a 200-foot crosscut on the Boston claim, together with drifts and surface cuts. The group was enlarged during the year by the purchase of adjoining claims. Good ore is reported. W. R. Chambers is in charge.

Pine Creek Placer—Operated through the Killen Warner Stewart Co. by the Pine Creek Placer Co. Two giants and a Ruble elevator were in use during the past year.

Oro Fino—Developed by 700 to 1000 feet of work, and was worked most of the year just passed. The last work consisted in sinking a winze from the main adit 50 feet, proving ore to that depth below the tunnel level.

Double Eagle—Crosscut tunnel of 1200 feet driven nearly to the main vein. In addition, 500 feet of drifting upon the vein in an upper level has been done.

Other properties which have received mention in the current mining literature during the past year are the Denver; Paymaster, with 400 feet of crosscut; Denny, proving ore for 1000 feet; and the Sixteen-to-One, adjacent to the Double Eagle.

The Bonanza District

The location of this district is at the headwaters of the North Fork of Burnt River, on the eastern slope of the Blue Mountain Range, township 10 south, range 35, 35½, and 36 east. The principal mine of the district is the Bonanza, which has been one of the greatest of Eastern Oregon mines, its total production being estimated at a million. In addition to the properties described below, important placers are operated, and the usual number of minor prospects are in evidence.

The Lucky Boy—The group was taken in hand early in the year by a company having headquarters at Worcester, Massachusetts, and development has since been in progress. A 300-foot tunnel had been driven at last accounts.

The Richmond—The vein upon this property is parallel to the Bonanza. It has a shaft 200 feet deep, drifts of 400 feet and other workings. Included in the equipment is a hoist and a 10-stamp mill. Operations have been suspended during the past two years.

The Pacific Group—Formerly known as the Kentucky and Tennessee. Located a mile and a half north of the Bonanza, in Westfall Basin. Four claims are included in the group, which is owned by W. E. Hurd. Developments have been active during the latter part of the year and now aggregate 500 feet.

The Jay Gould—Located near the head of Pine Creek and directly north of Whitney. About 2000 feet of development work has been

done upon the property. The three veins are approached by a crosscut, and results seem to warrant the erection of a ten-stamp mill, which it is expected will be installed soon.

Blackbird—Developed by a crosscut, 900 feet in length, which intersects three veins. Drifting has been done upon two of these.

Resolute—Adjoins the Bonanza on the southwest. Three leads have been developed by about 1000 feet of workings.

Gladstone—Located in Westfall Basin. The vein is opened by a crosscut 500 feet long. Drifting is now in progress. W. H. Mead is manager.

Bonanza—This mine is operated at present by means of a three-compartment shaft which has reached a depth of 1200 feet. A modern hoisting plant with a sinking capacity of 2000 feet is in use, and further depth is being sought continually. The adit tunnel through which the mine was formerly worked enters the shaft over 300 feet below the croppings. It is said that all the ore above the 600 level has been stoped out. Good ore bodies have been developed in the lower levels, however, and the property promises to continue its record as a large producer. Over three miles of workings are reported. The equipment includes a 40-stamp mill driven by a 320-horse-power steam plant, an aerial tram 2000 feet long, and the hoist described above. The mill has not been run at its full capacity during past the year, an average of 20 to 30 stamps having been operated.

Winterville Placers—This property was a very early location which has not only been very productive in its time, but which, on account of the discovery of a "Webfoot" bedrock three years ago, will undoubtedly yield a considerable output for many years to come. The newly discovered bed of pay gravels is five feet thick, and from two hundred to three hundred feet wide. It is covered by a layer of soil 12 to 20 feet in depth which must be removed before the deposit of cemented gravels carrying the values can be worked. The gravels occupy the bed of an ancient river which strikes up the slope of the present drainage system.

Cable Cove District

The mines of this district are almost all to be found in township 8 south, range 36 east. The district is 10 miles north of Sumpter, and on the watershed between the headwaters of the North Fork of the John Day River and Powder River. The ores are heavy with sul-

phides of iron, lead, copper, and zinc, the oxidized zone, according to Lindgren, being 30 to 50 feet deep.

Last Chance—Several claims are included in this property which is owned and operated by the Baby McKee Consolidated Mines Co., under the direction of L. G. Lilley. It is developed by 900 feet of tunnels and drifts, and a shaft 100 feet deep which is supposed to be at the point of convergence of the Gray Eagle and Imperial veins. The ore is auriferous pyrite, and is of a quality to justify considerable shipping during the development work. Offices and other buildings have been erected; a hoist with 500 feet sinking capacity has been installed; and preparations are being made for the building of a mill within the next few months.

Baby McKee—Property of the Baby McKee Consolidated Mines Co. Opened by about 3000 feet of tunnel work, included in which is a long crosscut to reach the Baby McKee and Chloride vein systems at 900 feet depth. At last reports this tunnel was in 1800 feet and had cut two or three veins upon which some drifting had been done. The ore is auriferous pyrite. A four-drill compressor is in use, and the installation of a mill is being discussed.

California—The California is one of the oldest mines in Eastern Oregon. It had been inactive for quite a period, however, when the present owners, the Turnagain Arm Co., took it up for further development a year or two ago. During 1903 a large amount of development work was done. The mine is opened by five tunnels and a long crosscut, the latter, with its drifts upon the vein, giving a depth of 1000 feet. The ore is carried by a gravity tram 2800 feet to the mill. Altogether 4280 feet of tunnel work has been done upon the property. Like other mines in this district the California yields ores heavy with sulphides, and for the treatment of these the company has installed a concentrating, roasting and cyanide plant. The concentrating plant consists of a 200-ton gyratory crusher, two sets of Cornish rolls, two new Standard tables, with sizers and other adjuncts. A reverberatory roasting furnace was installed during the last weeks of 1903, and also 12 leaching tanks. Power is supplied by an 80-horse-power steam plant. L. R. Bellman is manager.

Constellation—The Constellation group is on Big Limber Creek on the John Day slope of the district. It has a large, well defined vein which has had some development.

Crown Point—The location of this property is upon the Silver Creek side of the Cove. It has one good vein, yielding both milling and shipping ore, and two smaller veins. Development consists

mainly of a crosscut now in 900 feet which cuts the smaller veins and is supposed to be near the larger one. Other workings give a total of 1200 feet. A small compressor plant is in use.

Gipsy King and Gipsy Queen—These claims were purchased three years ago by a Boston syndicate, but for some reason have remained idle. It is reported that they contain good ore which has been opened by some 500 feet of workings.

Imperial—The Imperial group, consisting of 23 claims, is located east of the California. The Imperial vein is opened by an adit 1100 feet in length, the Eagle vein by a 500 foot adit,—these tunnels taken together with other workings making an aggregate of some 3000 feet. The ore, which contains galena, blende, pyrite, arsenopyrite, and chalcopyrite, carries good values and much of it has been shipped. The property has been retarded in its development by disagreements among its owners, but during the past year an understanding has come about, and rapid development is expected to follow.

Red Chief—This group includes five claims. A tunnel is being driven on the Ohio vein the breast of which is now 400 feet from the portal.

The Oregon Chief—Owned by the Oregon Chief Gold Mining Co. Seven claims which have had about 1600 feet of development work of all kinds done upon them, are in the group. Work was resumed at this property in November after an idle period extending back into the previous year, but later was dropped again.

Overland—The Overland, adjoining the California, is said to have three well defined veins which are to be reached by an adit now being driven.

Oro Fino—The property is owned by John Clark and Senator J. L. Rand, who have demonstrated the existence of ore of shipping grade. Surface work, a 60 foot shaft, and 400 feet of tunnels constitute the development work. Five claims are in the group.

Omaha Group—Seven claims, supposed to be upon the continuation of the California ledge, are comprised within the group. Development work has started again of late, the main tunnel being in 250 feet at last report.

Alpine—The Alpine group, owned by the Alpine Consolidated Gold Mining Co., John T. Grayson, manager, is located five miles northeast of the California. About 1000 feet of development work has been done upon the property. Last summer a saw mill was

installed and the material for a 20-stamp mill assembled. Building operations had not progressed far, however, when they were stopped by the coming of winter. The mill is to have 20 stamps with plates, six Johnson concentrators, together with crushers and other accessories. Steam power will be used, which will also operate the compressor plant.

Valley Queen—The Valley Queen Gold Mining Co. has a property of this name three miles north of the California. Thirty feet of vertical shaft, 200 feet of tunnels, and 75 feet of drifts upon veins cut by the tunnel, together with surface workings, constitute the development. Tom C. Gray, of Sumpter, is in charge.

The Storm King—This property is owned and operated by the Forest Mining Co., Thomas Costello, manager. Early in the year a shaft was sunk upon the vein, until at 60 feet sinking was stopped by water. A tunnel was then started to tap the vein farther down. The ore is said to be good.

Camp Carson District

The location of this district is in township 6, range 36 east, 20 miles north of Sumpter, at the western foot Elkhorn Range, and at the headwaters of the Grande Ronde River. According to Lindgren several good prospects are opened up carrying copper, lead, zinc, and gold. Placers are worked upon the Grande Ronde, Limber Jim Creek, and at Camp Carson itself. At the latter place the gravels are quite elevated, and so cemented that they are difficult to work by ordinary hydraulic processes. In a special report from the locality few details were given, but it is stated that the Carson Hydraulic Mines Co. has an aggregate of 26 miles of ditches heading in the Grande Ronde River. These ditches have a capacity of 7000 inches, the water being used in the several properties of this company. Twelve miles of ditch carrying 1500 inches of water from Little and Big Beaver creeks supply the placers upon Horsepool and Beaver creeks.

Canyon District

The mineral areas represented by this district are contained within townships 13 and 14 south, ranges 31, 32, 33, and 34 east,—all in the basin of the South Fork of the John Day River, and in Grant County. The placers of the district were famous in early days and are still productive, though no detailed information has been obtained from them for this work. Quartz mining will probably receive considerable attention with the advent of transportation facilities.

Prairie Diggings—This property includes three quartz claims. It is located three miles east of Canyon, and is owned and operated by the Jupiter Mining Co., J. W. Messner, manager. Three veins are said to exist, two of which are very large. A modern mill operating 25 stamps, six Standard concentrators, and a crusher, was installed in 1902 and has made a number of runs. Power is furnished by three water wheels. Within the last few months a hoist with a sinking capacity of 500 feet has been erected and a double compartment shaft is being sunk which, according to a late report, was down 110 feet. Other workings aggregate 1500 feet.

Oregon Wonder.—Late in 1902 a Philadelphia syndicate was incorporated which acquired the Oregon Wonder group of 22 claims on the north slope of Strawberry Butte; the Will Cleaver group of 22 claims seven or eight miles southeast of Canyon; and other properties in the locality sufficient to make an aggregate of 70 claims. Little or no work has been done upon these properties, but there seems to be good evidence that enormous low grade deposits exist, which may be worked at a profit. The promoters are at present directing their energies toward the construction of a railroad into the locality. Major J. W. Bonta is manager.

Black Butte.—Twenty-five full claims are included in this property, nine of them being patented. A large lode, said to be 100 feet wide and to carry a pay streak 20 feet wide, has been opened up by surface work, and some 500 feet of crosscuts, drifts and a winze. A hoist capable of sinking 500 feet is being installed. The ore taken out so far has been treated in a Merralls roll mill and a 5-stamp plant. Two acres of placer ground belongs to the property. E. C. Allen, of Portland, is manager.

Great Northern—This property of the Great Northern Mining and Milling Co. is about two miles southeast of Canyon. Development consists of tunnels and crosscuts, 100 feet of inclined shaft, and an open cut 70x40x30 feet. The ore is free milling, and is treated in a two-stamp Tremain steam mill. The property is closed at present. J. H. Beasley is superintendent.

Cornucopia District

The mineral areas comprised within this district are to be found for the most part in township 6 south, range 45 east, in the Eagle Creek range, and near the headwaters of Pine Creek. The district is 36 miles in a direct line northeast from Baker City, although it is 55 miles by road. The ores of the district, according to Lindgren, are

quartz and sulphides, which are to a great extent free milling, though there can be no doubt that, in addition to ores of this class, important values are to be found as tellurides. The principal mine of the district is that of the Cornucopia Mines of Oregon Company which is discussed below. In addition to this, there are a number of other promising properties which are continuing development.

The placer deposits of the district are unimportant.

Cornucopia—There are said to be 29 claims in this group, which has been operated for several years by John E. Searles and the receiver into whose hands that gentleman's affairs were placed at the time of Mr. Searles financial difficulties. The principal developments upon the property have been done upon the Union-Companion, Red Jacket, and Last Chance claims, and are estimated to be over 18,000 feet in extent. Ore of splendid quality has been taken out of the mine, and altogether the production is said to have reached ten million dollars. Operations were suspended last spring at the time of the death of the manager, Mr. F. C. Dobler, who was killed in a snow slide, but were resumed in October after a reported reorganization of the corporation owning it. Considerable activity was manifest until in December, the plan of the management seeming to be to open up the vein system at depth by driving a long crosscut, but at that time the work was unexpectedly brought to a close again. No information regarding the plans of the corporation for the future is given out. The mine is equipped with a 20-stamp mill, 20 Frue vanners, 2 slime tables, cyanide plant for tailings, compressor plant, and light plant.

Sanger—To the southwest of Cornucopia, in township 7, range 43, is a cluster of claims, chief among which is the Sanger. But little has been reported from the property this year. Early in the year a reorganization of the company is said to have been effected, the title of the new ownership being the Sanger Gold Mines Co. Some development work has been done, a small hoist has been installed, and the ten-stamp mill upon the property has been renovated. A large electric power plant on Eagle Creek is proposed for the near future, and a tunnel has been started to cut the veins at greater depth.

Sagamore—Among many other properties scattered throughout the territory extending westward from Cornucopia to the Powder River is the Sagamore, located 35 miles from Baker City, and in the vicinity of Cornucopia. The property, which is under the management of J. M. Gilkinson, is developed by 500 feet of tunnel, and 50 feet of inclined shaft. The equipment comprises a three-stamp mill provided with a concentrating table and settling tanks. Water is the motive power.

Among other properties of the entire district on which some work has been done, yet which have not been very active of late, are the Robert Emmett, with a shaft of two hundred feet and drifts; Wild Irishman, with open cuts and adits; Simmons, which has two large veins, on which nearly 1000 feet of work has been done; and many other smaller groups.

Cracker Creek District

The territory included within this district is practically that defined by the drainage basins of McCully's Fork, Silver Creek and Cracker Creek, three streams that join a short distance above Sumpter to form Powder River. It is seven miles north from Sumpter to the great center of mining activity found in the vicinity of the North Pole and other properties located upon the "mother lode." This lode is a remarkable vein, extending, according to Lindgren, for five miles south and west from the North Pole mine, strong and unbroken. The most important properties that follow the North Pole upon the vein are, in order, the E. and E., Columbia and Golconda,—the four covering a distance of about two miles. The continuation of the vein to the southwest of the last named mine has not proved itself nearly so rich as the northeastern portion. There are numerous veins parallel to the main lode, and splitting off from it, upon which the other mines of the district are located. Included within the western part of the district as above defined is the area frequently spoken of as the Ibex district.

The ores of the district are base, and are typified by those of the North Pole mine, a condensed description of which is to be found below.

In addition to the mines described in the sequel, the following have been reported as active in development during the past year:

The Basin; Bunker Hill; Cracker-Eagle; Cracker Jack; Esmerelda; Goldbug-Grizzly; Homestake; Justice; Morning Star; Ole Bull; Orleans; Porcupine; Sampson; Tammany; and Tennessee.

The Mountain Belle is reported abandoned; the mine and twenty-stamp mill of the Bald Mountain have been idle; the Ibex, said to be a rich property, was not operated during the year. The Gold Pan, located four miles southwest of Sumpter, upon the railroad, has received some development and the management is reported to have ordered a ten-stamp mill and steam sinking plant for spring delivery. The shaft was sunk 150 feet by means of a gasoline hoist.

Placer mining in the Cracker Creek district is relatively unimportant at the present time. The gravels in the streams below the vein system all contain gold, and have been worked more or less actively

ever since 1862. The more important placers are the Downie, Buck Gulch, and Ellis properties.

The North Pole—The North Pole, located upon the northeastern terminus of the main lode of the district, is generally accredited with being the greatest of Oregon's mines. It is owned by the Eastern Oregon Mining Co., Emil Melzer, manager. The property begins upon the lode at the northeastern end of the Excelsior claim of the E. and E., and includes, in order, the North Pole, More or Less, Villard and other fractions and parts of claims sufficient to give a total length upon the lode of 5447 feet.

The main tunnel on the property is a crosscut of 1000 feet which enters the ore body in the south half of the North Pole claim, and from which a drift is extended over 1700 feet. Tunnel No. 2 enters upon the vein 450 feet vertically above No. 1 and has been carried over 2000 feet on the vein; No. 3 is 270 feet vertically above No. 2, while No. 4 is 200 feet above No. 3. Blind drifts have been run between tunnels 2 and 3, and 3 and 4, while above each tunnel is a considerable number of open stopes. The upper levels have proved an ore body upon the More or Less claim, the shoot being of great magnitude and richness. It is marked upon the surface by a massive outcrop of almost barren quartz 200 feet wide. Recent developments are said to be in the lower levels with the purpose of proving the existence of the shoot at those depths. The ore below 100 feet is base, only a small percentage of the values being susceptible to amalgamation. An aerial tram 2500 feet in length runs from tunnel No. 4 to tunnel No. 1, and another tram 8000 feet in length traverses the distance from this point to the mill.

The mill is now equipped for crushing, concentrating and leaching, — the cyanide process being used to extract the values from the tailings. Thirty stamps are in use, together with six Overstrom and two Wilfley tables, and four Johnson and twelve Frue vanners. From the vanners the pulp is pumped to cyanide tanks. There are nine of these, 24x6½ feet, each equipped with two Butter's distributors. The slimes are decanted to six agitation tanks. Ten to fifteen days is necessary for each charge. The total capacity of the mill is 120 tons per day. Power is supplied by steam and two 48-inch Pelton wheels.

E. and E.—Between the Columbia and North Pole properties upon the main lode are located the Eureka and Excelsior claims and a fractional claim known as the Taber Fraction. The last named property adjoins the Columbia, and following it in order are the Eureka and the Excelsior which form a group commonly known as the E. and E. This property was the first to begin operations upon

the main lode, and to it, in addition, belongs the credit of having established the milling practice of the district. Complications arising from the terms of a lease given several years ago have prevented the operation of the mine since 1898, but during the past summer this matter was adjusted, and operations have been resumed under the direction of the Bourne Gold Mining Co., the original owners. The ore bodies are opened both to the northeast and southwest by tunnels from the basin of the creek which flows across the middle of the property. On the Excelsior side the tunnels have penetrated for 1000 feet; upon the Eureka side about 600 feet. In the lowest adit upon the latter a shaft has been sunk 240 feet from which levels have been driven into both claims, while in one of these levels a winze gives access to a third level. Altogether, 8000 feet of work has been done. The ore body is well defined, existing in three shoots with narrow division areas. The mill is equipped with 20 stamps and 16 concentrators. Both steam and water are used for power. Since work was resumed last July operations have been confined to the extraction of shipping ore from the adit levels, the shaft levels still being flooded. These are to be drained at once, however, and the mill placed into first class condition.

The Taber Fraction—A small section of the main Cracker Creek lode, lying between the Columbia on the southwest, and the Eureka of the E. and E. on the northeast, has been undergoing development during the past year. The fractional claim, known as the Taber Fraction, is 224 feet long, with a vein exposure at the surface of 75 feet. A stringer of rich ore six inches wide at the surface has developed a width of three feet at 100 feet depth. Numerous shipments of high grade ore have been reported during the past few months, which came mainly from the sump as sinking was in progress, though some stoping has also been done. A 25-horse-power gasoline hoist is the equipment. The property is owned by the Geiser-Hendryx Investment Co., of Sumpter.

Columbia—The Columbia Gold Mining Co. owns two claims upon that part of the main lode of the district lying between the Golconda and the E. and E. Developments are almost entirely upon the more northeastern claim,—the Columbia,—the Appomatox extending to the south and adjoining the Golconda being touched by the extension of some of the levels from the Columbia proper. Upon the latter a shaft having levels run at each 100 feet has reached a depth of 800 feet. Over 8000 feet of workings prove the ore body, which contains rich shoots of considerable magnitude. Steam power is used to operate the 10-drill compressor, the heavy pumping plant and the hoist. A ditch and electrical installation just being com-

pleted will give 200 horse power additional. The mill has 20 stamps and six Johnson concentrators, besides a cyanide plant for tailings. Mr. F. S. Baillie, who has developed the property from its prospect stage, is manager.

Golconda—The Golconda is the most southwesterly of the properties located upon the main Cracker Creek lode. It is owned by the Golconda Consolidated Gold Mines Co., and comprises two claims, the Golconda and the Wild West upon the main lode, and parallel claims. The mine is opened upon the Golconda by a double compartment shaft 500 feet deep, from which levels run at depths of 200, 300 and 400 feet, the drive from the 500 foot station being but a very short one. At the collar of the shaft is a tunnel extending 1500 feet to the south and into the Wild West claim. A hoist with 1200 feet capacity, two large pumps, and a six-drill compressor, are features of the mining equipment. The reduction plant has a 20-stamp mill with 16 Johnson concentrators. The concentrates have heretofore been shipped, but it is reported that a plant for treating them at the mill is to be installed. Motive power is obtained from a battery of three boilers and a water driven dynamo generating 120 horse power. The mine and mill have been running at practically full capacity all year. James A. Howard is manager and superintendent.

Cracker-Oregon—Development began upon this property in the summer of 1902 and at the present time amounts to over 1500 feet. The work done comprises three tunnels, a 100-foot shaft, and surface developments A ten-stamp mill has been partly completed, a hoist with sinking capacity of 500 feet has been installed, and a four-drill compressor is in use. Both steam and water power are available. Three claims are in the group, which is owned and operated by the Oregon Development Co.

Climax Group—This group is the first parallel to the west of the Columbia and Golconda claims. It comprises the Climax, Orizaba and other claims, besides a fractional claim and placer ground. It is opened by 1500 feet of workings. Geo. W. Grayson, of San Francisco, and P. R. Bishop, of Baker City, own the group.

Columbia Extension—The old Ohio company was reorganized at the beginning of the year as the Columbia Extension Gold Mining Co. Its property is supposed to be upon an extension of the Climax vein. A shaft 60 feet deep and 800 feet of other workings are upon the claim.

Nine Strike—Three claims parallel to the North Pole are comprised within this group. A well-defined vein of considerable width

exists which has been developed to the extent of 500 feet. It was bought late in 1902 by W. T. Young.

Little Cracker—Two veins parallel to the main lode are upon this property. A tunnel which is being run to tap both of them has passed the first at 150 feet from the portal, and may reach the second at 500 feet. Ed. Butz, Sr., is manager for the Little Cracker Gold Mining Co., which owns the claim.

Mountain View—A vein parallel to the North Pole is said to be upon this property of the Mountain View Mining Co., of which Judge W. M. Cake, of Portland, is a principal stockholder. Two crosscuts, one 300 feet and the other 500 feet long, have been driven to the vein, and a shaft is now being sunk from the lower adit drift. Developments amount to 1700 feet in all. A 25-horse-power gasoline hoist is a part of the mining equipment. W. Techow, superintendent.

Mammoth—The Mammoth Gold Mining Co. owns two claims, the Mammoth and the Belle of Baker, both lying in the western border of the district. A shaft 400 feet deep, and a tunnel with crosscuts and drifts open the vein. A five-foot Huntington mill and a hoist make up the equipment. Frank Philbrick, manager.

Cracker Summit—This property, consisting of 11 claims and fractions, is located upon what is supposed to be a branch of the main Cracker Creek lode splitting off at the Columbia. It is east of the lode and adjacent to the E. and E. and North Pole. The Killen, Warner, Stewart Co., of Sumpter, controls the property. Two adits with drifts amounting in all to 1500 feet of work disclose the ore body.

Victor—The Cracker Consolidated Mining Co., of which A. G. Hanauer, of Spokane, is fiscal agent, acquired five fractional claims last spring which were previously supposed to be E. and E. patented ground. The property is said to cover some branches of the lode from the Columbia and the Taber fraction. Development is in progress,—a six-drill compressor being in the course of installation at the present time to prosecute this work.

Midway—Sixteen claims are in this group, which is owned by the Midway Consolidated Gold Mining Co. Six hundred feet of surface tunnel work has been done, and a double compartment shaft is now down about 200 feet. A hoist with a sinking capacity of 1200 feet, and a saw mill with a capacity of 10,000 feet per day, make up the equipment.

Gold Hill and Weatherby Districts

In township 12 south, ranges 43 and 44 east, near the town of Durkee on the O. R. and N. railroad, is an area of mineral deposition which includes the localities commonly known as the Gold Hill and Weatherby districts.

Gold Hill—This group is four miles southeast of Durkee. It is well developed, and is equipped with a 10-stamp mill, ore crusher, and four Johnson concentrators.

Gold Ridge—Located west of Burnt River, four miles south of Durkee. In the amount of its development and in equipment it is very similar to the Gold Hill property.

The Weatherby district extends from the town of Weatherby northeast for six miles or more. Both placer and quartz mines are found upon Sisley Creek and its tributary, Chicken Creek, from which no reports were received. In the bed and high bars of Burnt River placer gold also occurs. Upon the extreme east of the district is a cluster of mines described as follows:

Weatherby Bonanza—Development to the extent of 1000 feet, five-stamp mill, and a gasoline hoist.

Interstate—Workings 1100 feet in length and a two-stamp mill driven by gasoline power.

Little Hill—Eight hundred feet of development, two-stamp mill, gasoline power.

Dana—Six hundred feet of development, two-stamp mill, gasoline power.

The Connor Creek Mine—Located upon Connor Creek, a tributary of Snake River, six miles east of Weatherby district, and fourteen miles down the Snake River from Huntington. The mine is another of the famous older producers of this part of the state. It is owned by the Connor Creek Mining and Milling Co., but at present is under lease to Captain J. Myrick, formerly superintendent of the property. It is opened by a number of tunnels on the vein in the upper portions, and by a crosscut 3000 feet long at the 1200-foot level. A 35-stamp mill driven by water power reduces the ore.

Granite District

The mines of this district are to be found for the larger part in township 8 south, range 35½ east,—and within a distance of seven or eight miles north and east of the town of Granite. The placer

mines of the district have been worked since the early sixties, and one or two of the quartz mines since the seventies. Besides the mines described below, active operations have been reported from the following:

The Scorpion; Snow Bird; Tahoma; Botha; Climax; Captain Martin, Sheridan, and Last Chance; Buffalo; and Uncle Sam.

Among the important placers of the district may be mentioned Thornburg's and Klopp's placers on the North Fork of the John Day; Johnson's placers on Crane Flat; the Black Pine placers near the Cougar mine; and Griffith's placers on Canal Creek. Of the above, the Crane Flat placers are said to be of exceptional interest, and may be the scene of extensive dredging operations in the near future.

Monumental—This mine, the oldest in the district, after a period of idleness dating back to 1894, is again being worked, this time under the management of Mr. C. J. Allen. It is opened by two crosscuts, the upper being 900 feet long and having drifts run from it upon three or four prominent veins. The lower crosscut is in 1600 feet, in which distance it has cut 26 veins, the widest being five feet. Drifts have been extended upon three of the strongest leads. The ores are rich in ruby silver and argentite, the gold values increasing with depth. The mill upon the property was a model in its time. It has 20 stamps for dry crushing, two settlers, two pans, a Howell and White roaster, and a six-drill compressor. The 150-horse-power steam plant has been renovated during the past year.

Cougar—This mine is the property of D. L. Evans and J. W. Larkin, of Spokane. It is four miles north of Granite. Developments consist of a tunnel and drifts upon the large vein aggregating 1400 feet, a shaft 80 feet deep, and three or four short tunnels. A lower crosscut has been started to cut all of the veins of the system. Development has disclosed a large amount of ore. The reduction plant consists of a gyratory crusher, two sets of rolls, two Brueckner roasters, and a cyanide plant with 200 tons per day capacity.

The La Belleview—This property is one of the oldest of the district, having been worked intermittently since 1877. Two parallel veins are opened by three tunnels, which, with other development work, give a total of 7000 feet. In recent years operations have been suspended on account of litigation, but work was resumed in a small way in the fall of the past year, and there is a probability of its being continued in the spring. The ore minerals, according to Lindgren, are pyrite, chalcopyrite, galena, pyrrhotite, and strongly argentiferous zinc blende, together with native wire silver, argentite,

tetrahedrite, stephanite, and freiburgite. The property is equipped with a small Huntington mill. Bamburger and Keith, of Salt Lake, are the owners.

Magnolia—The Magnolia is another of the older mines of the Granite district which has been idle for some time, but which, through a reputed change of ownership, is expected to be worked again soon. Development has been done in three tunnels, aggregating 1300 feet, and disclosing a large amount of low grade ore. A ten-stamp mill, erected in 1899, is upon the property.

Independence—This group comprises three full claims and three lode fractions located between the Cougar and Magnolia properties. Two veins have been defined by a large amount of work,—1000 feet having been done the past year upon the shaft and three tunnels of the property. George F. Berbridge is owner.

Big Four—A crosscut of 500 feet has opened the vein, and drifts were extended a short distance on two of the veins proved. Another crosscut of 700 feet is projected, at greater depth.

Climax—A crosscut for the main vein, following, however, a smaller fissure, has been driven between 700 and 800 feet, and is expected to reach its objective point soon. The property also has much surface work.

Greenhorn District

This district lies mainly in township 10 south, ranges 34 and 35 east, and adjacent to the Bonanza district which bounds it upon the east. It is 14 miles from the center of the district to Whitney. The proposed extension of the Sumpter Valley railroad will pass within six miles of Greenhorn.

The mineral deposits of the district occur in fissure veins, and are characterized by high silver values. A considerable proportion of the ore is base, carrying blende, pyrite, arsenopyrite and tetrahedrite.

A very large number of prospects is undergoing development in the district, many of which are of considerable promise. Reports of activity have been received from the following, the amount of work done upon each varying from 300 to 1000 feet:

Aurora; Big Elk; Big Johnny; Blackeye; Chloride; Dunn; Eldorado; Gold Coin; Golden Star; Gordon; Humboldt; Intermountain; Intrinsic; Lucy; Man-o'-War; Nashville; New York Consolidated; Ornament and Surprise; Potosi; Red Lion; Salmon; Smuggler; West Side; White Carbonate; and Worley.

Ross Gulch—This property, consisting of six claims, located two miles west of the Bonanza, is opened by a shaft 167 feet deep, with drifts at 100 feet and at the bottom. In addition to this two shallow shafts and much surface work are upon the property. The prospect is said to be good.

Forty-nine Jimmy—This property is as yet in its first stages of development, but is of interest from the claim made for it that a streak of sylvanite is found in the vein at the bottom of the 40-foot shaft.

Banzette—A small vein of good ore is reported from this property, owned and operated by Dave Choate. Developments consist of a shaft and drifts on the vein amounting to 500 feet, and a crosscut which cuts the vein 1200 feet from the portal. A raise is being made from this tunnel to the surface,—a drive of about 300 feet.

Black Hawk—This property is opened by several hundred feet of workings. A three-stamp Tremain mill and a concentrating table reduce the ore taken out in the course of development.

Belcher—Owned and operated by the Daines Gold Mining and Milling Co. Two groups, one upon the Belcher vein, and the other upon the Golden Gate vein, are under development. Upon the Belcher there is a crosscut of 100 feet, and a drift upon the vein 1800 feet long in the course of which four ore shoots were encountered. A crosscut upon the Golden Gate revealed a wide vein upon which 400 feet of drifting has been done. A ten-stamp mill with six concentrators has been ordered. Water power will be used.

Psyche—Judge J. Fawcett, of Omaha, has the controlling interest in this mine, which is opened by a shaft 130 feet deep, a crosscut 300 feet in length, together with drifts of a few hundred feet and a raise to the shaft level. A 20-stamp mill was completed which has run intermittently, part of the time doing custom work. Eight Frue vanners and a 120-horse-power steam plant are included in the mill equipment.

Snow Creek—A 10-stamp mill operated by an eighty-horse-power steam plant has just been completed at this mine and is now crushing the ore dumped during the development to date. A shaft 190 feet deep with 200 feet of drifts disclose a fair sized vein and an ore shoot 300 feet long. Mr. Fred D. Smith is manager.

Don Juan—This mine was bonded in August to Eastern people, and immediately afterward was pumped out and further development started. A shaft 187 feet deep with short drifts on two levels, and a tunnel 800 feet long driven from the level of the shaft collar consti-

tute the development work. A 10-stamp mill and a small hoist are features of the equipment. Late advices are to the effect that work was again suspended and the pumps pulled.

Phœnix—Two well defined veins are opened in this mine by a tunnel 900 feet long on the vein and connections with upper workings. A five-stamp mill and a five-foot Bryan mill constitute the reduction plant. Operations have been vigorously prosecuted during the year, although in December water litigation prevented the running of the mill. Charles Parker is in charge.

Virginia—The North Pacific Mining Co., of Seattle, is the owner of this property. The mine is opened by a shaft 210 feet deep, from which drifts have been run on the 60- and 120-foot levels for a distance of 150 feet. A large mill building was erected during the past year and a Parker Rotary mill set up. This mill, however, did not prove satisfactory for the kind of ore to be treated, and is being replaced by 10 gravity stamps.

Tempest—1000 feet of development work is stated to be the amount done upon this property, which is owned by the Tempest Mining and Smelting Co., of Spokane. A wide vein is reported, having good ore on both walls. C. R. Aldrin is manager.

I. X. L.—Two shafts are upon this property,—that upon the I. X. L. vein being down 200 feet with drifts on both levels,—while upon the Hidden Treasure the shaft is 100 feet deep, with 100 feet of drifts from the bottom. Three well defined veins are disclosed in which promising ore shoots are contained. A hoist with 500 feet capacity is a part of the mining equipment. The reduction plant consists of a three-stamp Tremain mill and a 30-ton cyanide plant. F. G. Kelly is in charge.

Morning—The Morning is owned by Messrs. Simmons, Ames, Cooper and Chisholm. The main adit is a crosscut 100 feet long which reaches the wide ore body 50 feet below the surface. Drifts have been run on the three veins proved. A deeper crosscut on the mill level has been driven 500 feet and is now near the first big vein where a depth of 200 feet below the upper workings will be given. A five-foot Bryan mill and two Wilfley tables are in operation, and ten stamps at the Psyche mill were in use for a time crushing ore from the Morning.

Dixie Group—This group is on Granite Boulder Creek, south of the district proper. It seems to be a large low grade proposition developed by some 300 feet of tunnels and surface cuts. A Kinkead mill and concentrator capable of treating 15 to 20 tons per day was installed during the year. Messrs. Ray and O'Neil are the owners.

Listen Lake—This is a copper proposition located upon McNamee Creek. Developments have been under way all year. An air blast has been installed, and grading for a hoist has been done. The main shaft is 60 feet in depth. J. W. Wilson is manager.

Royal White—Adjoins the Belcher property. It is developed by some six hundred feet of workings, and is equipped with a small three-stamp mill. It was bought during the year by J. P. McGuigan and associates.

Worley—This mine has a shaft 160 feet deep from which short drifts have been run. The property was recently taken over by a a stock company, and further development is in progress.

Aurora—A shaft house and other buildings have been completed preparatory to the commencement of sinking operations. The property was bought last year by W. H. Mead, of Spokane. Lightly developed.

Humboldt—This mine is the property of the Fortune Mining and Smelting Co., G. W. Daines, manager. A large hoist building was erected in the course of the year, and a small gasoline hoist installed to aid in sinking further in the 70-foot shaft of the property. Threatened litigation has barred operations, however. Four small veins are indicated by surface workings.

Red Lion—This is a group of four claims, purchased late in 1903 by the Fortune Mining and Smelting Co. It is opened by 300 to 400 feet of surface work, and a crosscut of 150 feet, from which a drift has been started on the footwall of the vein.

Lucy—This property has been taken up by a stock company, buildings have been erected, and crosscut of 150 feet driven to open the main vein. Work in charge of S. R. Stott.

Intrinsic—An old silver mine,—the first worked in the entire district. More than two thousand feet of work has been done upon it. The late Jack Powers, of Portland, was associated in its ownership with other Portland people.

Imnaha District

A copper-gold district eight miles long by four wide is located at the confluence of the Imnaha and Snake rivers in Wallowa county. The mineral area is approximately in township 3 north, range 49 east. River transportion down the Snake is said to be possible,—a fact which will have much to do with the future of the district. No

detailed information has been obtainable from the locality, but reports of activity have been frequent.

The Eureka Smelting Co. has had a force of men at work developing its property, and is at the same time building a roasting and leaching plant. This plant is also to treat the ore from the Fargo Mining Co.'s mine.

A placer mine is reported upon Dry Creek for which a ditch two miles in length carries 1000 miner's inches of water from the Imnaha for six months of the year. The gravels are said to carry 30 cents in gold per yard.

The Iron Dike District

This district is for the greater part contained in township 6 south, range 48 east. It lies along the western bank of Snake River and extends practically from the mouth of Pine Creek to the Wallowa County line,—a distance of twelve miles. The ores of the district are of value for their copper content, the values in gold and silver being low. Prospecting is said to be active in the district, but substantial progress can scarcely be hoped for until a railroad is constructed. The nearest point upon the railroad at the present time is at Nagles, near Huntington, a distance of 50 miles. River navigation from Lewiston is impossible,—but for three months in the year navigation between the district and Huntington is a bare possibility.

The Iron Dike property described below is the principal one in the district. Another, known as Joe the Greek, owned by W. B. McDougal, has also received considerable development. Lindgren mentions a number of prospects from which, however, no data have been received for this work.

Iron Dike—The location of this property is upon Snake River just south of Homestead. It has been under development since 1897, with Frank E. Pearce in charge. The owning corporation is the Northwestern Copper Co. The ore deposit, which consists of pyrite and chalcopyrite carrying small values in gold and silver, is of great size,—a vein width of from 70 to 300 feet having been demonstrated. Three crosscut tunnels give access to it. The Ladd Metals Co., under contract with the owners of the property, is building a 100-ton smelting furnace and a small sampling plant at the mine.

Malheur District

The mines of this district are to be found in the extreme northern part of Malheur County in township 13 south, ranges 40 and 41

east. It was famous in early days for its placer gold, and still yields a comparatively small amount of this material. Few of its quartz properties have outgrown the prospect stage. Among those which have been reported active during the past year are the following:

Bartolf; California; Fidelity; Humboldt; Kidd and Tedrowe; Morning Star; Rainbow; St. Joe; and Uncle Sam.

The Rich Creek placers are operated by the Eldorado Ditch Co., a hydraulic elevator being used to enable the gravels to be worked at a greater depth than formerly. Water for this mine is taken from the famous Eldorado ditch, completed in 1874, which carries its supply for over a hundred miles from the headwaters of Burnt River. Four hundred miners inches for eight months is the present capacity of the ditch.

Black Eagle—This property is located just north of Malheur City upon a great porphyry dike 300 to 1000 feet wide carrying values said to be one to four dollars per ton. The ledge is opened by a tunnel 300 feet long having two upraises to the surface. The ore is quarried at the surface and passed down the upraises, going over grizzlies in the course of its descent. But one man is required to mine sufficient ore for the mill,—the cost of mining and delivering being 20 cents per ton. The ore is free milling to a depth of 80 feet, below which it carries its values in sulphides. The mill has an 11x17 Blake crusher, and twenty 850-pound stamps which drop 110 times per minute. Twenty-mesh burred screens are used. Amalgamation is entirely outside, the plate area being 64 square feet for each five stamps. The milling record is six tons per stamp in 24 hours. Steam power is used with wood at five dollars per cord. The cost of milling is 49 cents per ton. Concentrators and cyanide tanks will be installed in the near future. J. F. Meikle is manager.

Red, White and Blue—This property adjoins the Black Eagle group and is located in part upon an extension of the big porphyry dike of the latter. This extension is opened by a tunnel, but the principal workings, consisting of a 160-foot shaft with drifts upon two levels, are located upon a different lead. The mill upon the property now consists of a battery of ten Merralls rapid drop stamps,—six of these having been installed recently.

Tarbell—A Boston company purchased this property in August and has been pushing development since. A ledge 15 to 25 feet wide is developed by 2000 feet of workings.

Minersville District

Extending for 20 miles between Sumpter and Baker City is the territory to be discussed under the above heading. It includes the Deer Creek, Minersville, Stice Gulch and Auburn districts proper. According to Lindgren the country is characterized by an absence of strong vein formations, there seeming to be only numerous veinlets and seams carrying gold,—these apparently being the source of the placer gold which was so abundant in former years. Nevertheless prospecting for ledges continues, and significant ore bodies have been reported from some of the properties. The following have been more or less active during the past year: Golden Wizard, Flora M., Yankee Girl, Bear Gulch, Wisconsin, Mac's Luck, and Old Abe.

The placer interests of this territory were in early years of great importance, but have declined until at the present time they are inconsiderable. A revival of interest in this form of mining seems to be in evidence, however, and it is possible that by new methods something may be accomplished.

Wisconsin—A shaft has been sunk upon this property to a depth of 200 feet and a slight amount of drifting has been done. The main vein is explored by an adit 400 feet long, while a short crosscut gives access to a parallel vein.

Golden Wizard—Developments upon this property consist of a shaft 160 feet deep from which a small amount of drifting has been done, and a tunnel 600 feet long upon the main vein. Work is in progress upon a mill which is to have 12 rapid drop stamps.

American Development Co.—This company has within the past two years purchased most of the old Auburn placer grounds, and last season completed a tail race which will enable the operators to work at greater depth than was formerly possible. Five hundred inches of water were also added to large rights already existing. L. Q. Jaquish, manager.

Auburn Deep Mining Co.—A shaft is being sunk in Blue Canyon through "Webfoot" bedrock in the hope of disclosing pay gravels at depth. The shaft is now down 110 feet without having reached permanent formations.

Stice Gulch Placers—Two reservoirs were completed at this property during the past year, several hundred feet of tail race was finished, and prospect tunnels were driven into the gravels in search of a rich channel supposed to exist there. The gravels are 20 to 30 feet in thickness. Two or three giants are in operation.

Mt. Rastus District

A mild stampede of prospectors occurred during the fall into what is known as the Mount Rastus district, 55 miles southwest of Baker City. The reputed discovery of rich sylvanite deposits in phonolite has not been substantiated up to the present time.

North Powder District

A small group of prospects is to be found in the vicinity of North Powder,—a station upon the railroad 25 miles or so north of Baker City. The ores carry copper and gold. Of the properties in the district the *Buckeye* is the most extensively developed, having a shaft down 160 feet with drifts upon two levels.

Quartzburg District

A few miles north of Prairie City, Dixie Creek divides into two branches which are separated by Cougar Ridge, and upon each branch mines are to be found. The district so formed lies within townships 11 and 12 south, range 33 east. The mines of the west fork are mainly auriferous; those of the east fork carry copper, and in a notable case, cobalt and nickel. Placer interests in the district are unimportant at the present time.

In addition to the mines described in detail, the following lesser properties have been actively engaged in development work during the year:

Bangs; Byson; Dixie Meadows Extension; Duro; Fitzsimmons; Gallagher; Gifford; Hughes and Short; Mercur; Paul Kruger; Smith; Trowbridge; and Yankee Boy.

Colorado.—Late in 1902 the Equity Mining Co. purchased the Isham Laurance interests, consisting of a five-stamp mill and several claims. The property has undergone thorough renovation and a concentrating table has been added. Development consists of a tunnel 600 feet long, another 500 feet long, and a third just started.

Copperopolis.—This mine is located upon the West Fork of Dixie Creek and near the north end of Cougar Ridge. The Copperopolis Copper Co., composed largely of Portland people, is owner. Two hundred acres of mineral and timber ground constitute the holdings. The ore body forms two massive croppings, and has been opened by a crosscut 800 feet long. Values are in copper, gold and silver. A two-drill compressor is driven by steam. Water power sufficient for operating a lighting plant is also used. W. W. Gibbs is manager.

Dixie Meadows—Located at the base of Dixie Butte, 12 miles north of Prairie City, and in the northern edge of the Quartzburg district. The vein, which varies from 10 to 55 feet in width, is reached by two crosscuts,—the upper 150 feet and the lower 300 feet in length. Several hundred feet of drifting has been done. A concentrating plant has just been installed, consisting of a No. 2 Austin gyratory crusher, two sets of 6x36 Sturtevant centrifugal rolls, four Standard concentrating tables, and a 120-horse-power steam plant. Values are in gold. The mine is the property of Prairie City people, incorporated under the title of The Dixie Meadows Mining and Milling Company.

Keystone—An old mine that has recently been taken in hand again for exploitation. The amount of workings accredited to it is 1500 feet. During the year just closed new buildings have been erected, new steel laid, and old tunnels retimbered. Development is in progress.

Present Need—This is another old property with considerable production to its credit even in the face of imperfect methods of extraction. The upper workings consist of a crosscut and 300 feet of drifts. A lower crosscut reaches the vein 700 feet from the portal, and drifting is now in progress from it. A modern arrastra, driven by steam, reduces the ore. F. P. Morey is principal owner.

Standard Consolidated—Early in the year a combination of interests was effected by which the Standard, Copper Ridge, and Willie Boy groups were consolidated and acquired by the Standard Consolidated Mines Co., Dr. E. W. Mueller, of Sumpter, manager. Two vein systems exist upon the property, the Standard system being said to consist of five veins supposed to converge directly under a prominent cropping. It is opened by a 500-foot crosscut, a 100-foot shaft, several raises, and some drifting. The ore carries gold, copper, cobalt, and nickel. The cobalt content is of especial interest on account of the rare occurrence of that metal in this country. Several tons have been concentrated and placed upon the German market. The cross system of veins is opened by two crosscuts 100 feet and 450 feet long respectively, a shaft 60 feet deep, a tunnel 100 feet long, together with drifts and numerous surface cuts. It runs nearly at right angles to the Standard system, and carries gold values. A 40-ton matte smelter is upon the property, but has not been successfully operated.

Red Boy District

The location of this district is southwest of the Granite district, of which it is really a continuation. The great mine of the district is the Red Boy. Ores in the district are for the greater part free milling, the percentage of sulphides being small and carrying low values. Properties not described in detail below, and which have been reported active in development are the following:

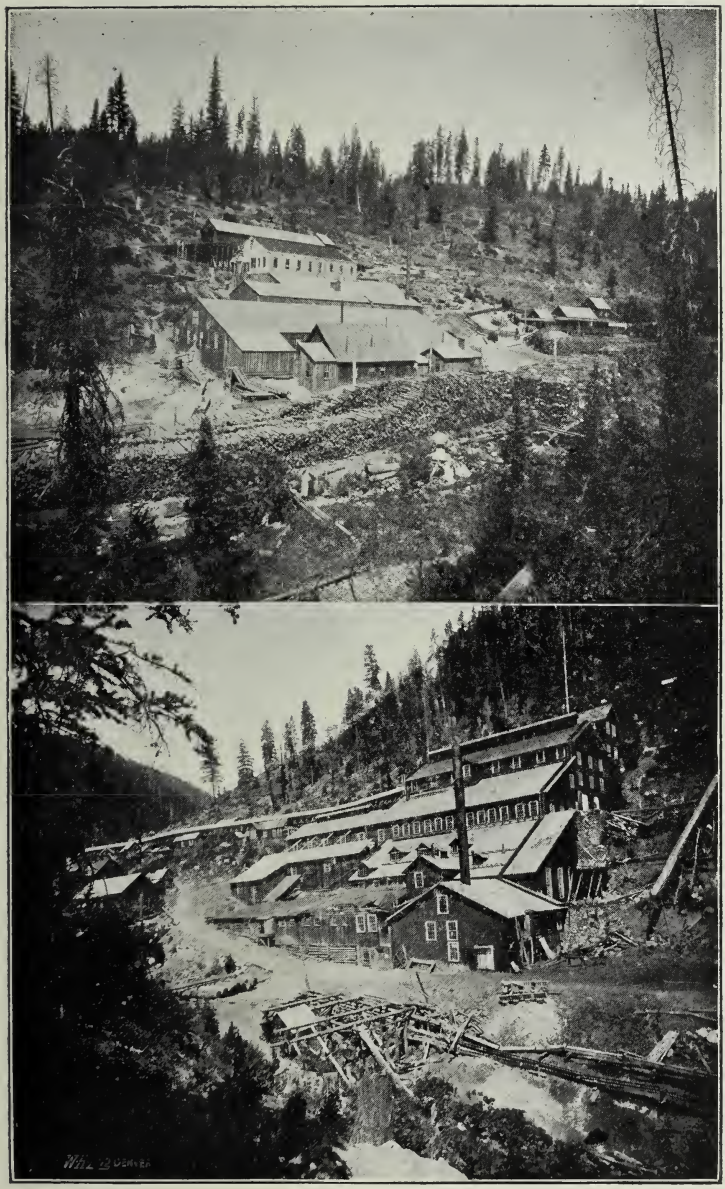
Black Jack; Buckhorn; Chelan; Comstock; Excelsior; Standard; and Yellow Daisy.

Red Boy—This mine is the central one of the district. Its career has been most interesting,—three different mills having been tried in the attempt to obtain values from its ores before the present plant was erected in 1898. Since that time the production of gold was uninterrupted until in last October, when financial difficulties brought on by a variety of circumstances culminated in the appointment of a receiver for the property. Late developments in the mine had encountered much water, necessitating the operation of heavy pumps. These were kept going for a while after the close-down, but later were ordered stopped, so that everything is now at a standstill pending the outcome of a very complicated condition of affairs. The mine is credited with having produced more than $800,000 in gold from two of its six veins.

The vein system of this property is cut by a large porphyry dike. Upon the north of this dike are the Monarch, Red Boy, Blaine, and Concord veins, and upon the south of it the Congo and Helena veins. A crosscut 1200 feet long cuts the Monarch and Red Boy veins at 400 feet depth, where much stoping has been done,—the ore shoots at this point having supplied the funds for the equipment put in later. The other veins of the property have been opened by a maze of workings. At the last the energies of the management were directed toward the opening of the ore shoots at a greater depth by means of a three compartment shaft sunk near the intersection of the Monarch and Red Boy veins with the main porphyry dike mentioned above. Much water was encountered in the progress of this work.

The mine equipment consists of a magnificent hoist capable of sinking to 2500 feet, three 160-horse-power boilers, a Corliss engine, a 16-drill compressor, and heavy pumps. The 20-stamp mill is supplemented by 14 concentrators, a roasting furnace, and three 60-ton cyanide tanks. The mill was operated by water power obtained from Clear Creek.

May Queen—The May Queen, with four claims, covers the northern extension of the Red Boy. The veins are opened by 800 feet of



Parker, Photographer, Baker City.

NORTH POLE MILL, CRACKER CREEK DISTRICT.

E. AND E. MILL, CRACKER CREEK DISTRICT.

tunnels and crosscuts. A small hoist was installed during the year with which a shaft was sunk 150 feet upon the principal vein. A ten-stamp mill is upon the property. John Thornsen is manager.

Oregon Monarch—This mine is also reputed to be upon an extension of one of the Red Boy veins. It is opened by a crosscut 1300 feet long from which drifts have been run upon several of the veins encountered. Air for the power drill used in this work was supplied by the Red Boy compressor.

Blue Bird—Located across the gulch from the Red Boy. Developed by a crosscut 500 feet long and drifts aggregating 400 feet. Three veins were cut in the crosscut. A mill is nearing completion consisting of a No. 2 gyratory crusher, a 12x16 Sturtevant roll-jaw crusher, two sets of 36x6 Sturtevant centrifugal rolls, and four Standard concentrators. A six-drill compressor is also a part of the equipment. O. C. Wright is president of the Blue Bird company, and E. J. Thorpe is manager.

Grand Union—This claim is supposed to be upon an extension of the Concord vein of the Red Boy system. A crosscut driven to tap this vein is now in about 800 feet. Two or three other veins have been encountered in the course of this work.

The Rock Creek District

Comprised within this district for the purposes of the present work are the Rock Creek district proper, lying north of the Elkhorn range in township 8 south, ranges 37 and 38 east; the Baisley-Elkhorn district, lying east of the Elkhorn mountains in range 38; and the Pocahontas district, situated in the northern half of township 9, range 39. This territory is northwest of Baker City, the nearest portions being about ten miles from that place and extending in a general northwest direction for a dozen or fifteen miles more.

The Baisley-Elkhorn—This property is one of the older producing properties of Eastern Oregon. It is located on Elkhorn Gulch, high up on the eastern slope of the Elkhorn Range. Late in 1902 it was purchased by the Beaver company, and consolidated with the Robbins-Elkhorn and Beaver properties, the combination giving some 70 or 80 claims in a body. The present equipment consists of two Bryan mills with plates; six percussion tables; four vanners; and a canvas plant. During the past year operations have been resumed in the old workings, which, after having been drained and put into shape after a long period of idleness, are again supplying ore to the mill. Preliminary to operations upon a much larger scale the man-

agement is installing a power plant upon Pine Creek, a mile below the mill, and a sixteen-drill compressor to be used in driving a cross-cut over a mile long to tap the main vein at 1200 feet depth. Mr. F. P. Hayes is manager.

South Pole—The South Pole Consolidated Mines Co. is a stock company owning a group of nine claims on the Rock Creek side of the Elkhorn divide. Development was active during a part of last year, but had come to a standstill by December. A large vein is said to have been opened by four tunnels having an aggregate length of 2000 feet.

Big Horn—This is a group of four claims extending over the divide between Rock Creek and Cracker Creek, and bonded by the Killen, Warner Stewart Co. A five-foot vein of good milling ore is said to have been opened.

Chloride—The Chloride group of six or seven claims, located on Rock Creek, has been developed by several thousand feet of tunnels and drifts upon the vein. The ore carries galena as well as tetrahedrite, and is in a well defined vein. A concentrating plant is a possibility of the near future.

The Octo (*Pocahontas*)—Three thousand feet of development work is reported from this property. A ten-stamp mill with concentrating tables and steam power was erected during the year, but has not been in continuous operation. A. B. Patterson is in charge.

The Kelly Group—The vein upon this property is parallel to the Cracker vein upon the southern side of the divide in Cracker Creek district. It is opened by six or seven tunnels from 60 to 500 feet in length which define a good ledge carrying base ore. Dan Kelly, of Baker City, is owner.

The Maxwell—The Maxwell is another of the older mines of the district. Over 4000 feet of development work has been done in it upon eighteen levels. The ore is heavily loaded with pyrite associated with galena and also values in free gold. In 1903 the property was taken over by the Eldorado Gold Mining Co. and the ten-stamp mill renovated. Shipments of concentrates were being made regularly as the year closed.

Carpenter Hill—The Carpenter Hill property is located in the old Pocahontas district nine miles west of Baker City. Three small veins have been developed during the past year or two. A five-stamp mill was erected early in 1903 and has been operating steadily.

The Highland—The Highland Gold Mines Co. owns a group of

12 claims acquired early in 1903 from M. H. Knapp. Development consists of a large number of open cuts and a number of short tunnels and crosscuts, together with a shaft sunk at the intersection of the Glasgow and Eldorado veins. The ore consists of massive pyrite carrying galena. Development is active, and results are said to be encouraging.

The Rye Valley District

The Rye Valley district adjoins the Malheur district,—lying to the east of the latter in township 13, range 43 east. Its placers have long been worked, and are still productive though no details are available for publication. No activity in the quartz prospects has been reported for the past year.

The Spanish Gulch District

The Spanish Gulch mining district is located in the southeastern corner of Wheeler County, in township 13 south, range 25 east. Its placer deposits have been worked since the first discovery of gold in Eastern Oregon, but as yet the quartz ledges, of which a considerable number are known to exist, have received only slight development. The ores are base,—carrying pyrite and pyrrhotite together with other sulphides in less quantity. The oxidized zone extends to a depth of 200 feet.

Argillite—James J. Baker is the owner of this property, which has been developed by 125 feet of tunnel. The ore is said to carry pyrrhotite containing values in gold, silver and cobalt.

Blue Bucket—Five claims are in this group which is owned by H. A. Waterman. It is developed by surface cuts and 200 feet of tunnels. Cobalt is also reported from this property.

Black Maria—Charles Rutherford is owner of this claim, which is opened by 300 feet of workings.

Rosa D.—Owned by Brown and Hines, of Antone. Nine hundred feet of workings exist. The ore carries pyrite, but amalgamation in an arrastra recovers most of the values.

Red Jacket—Frank Allen is the owner of this property. Shafts aggregating 150 feet of work have been sunk. The ore is free-milling.

Pauline—W. H. Steel, of The Dalles, is owner. The mine is opened by 100 feet of shaft.

Klondike—W. W. Cowne, of Antone, has sunk an inclined shaft upon this property to a depth of 75 feet.

Spanish Gulch Placers—This property is owned by F. Creighton and Co., of Antone. The bed rock consists of hard-pan and clay. One thousand feet of pipe and a ditch bringing 150 inches of water four miles from Rock Creek constitute features of the equipment.

Patterson Placers—The bed rock at this mine is porphyry. One thousand feet of seven-inch pipe and a ditch one and one-half miles long from the east fork of Birch Creek bring 100 inches of water for placer work. Dave Patterson is owner.

Owens Ditch—This ditch brings 125 inches of water from the west fork of Birch Creek. The supply is rented to various local operators.

Sparta District

But little is to report from this district for the year just closed. The Gem, formerly one of its principal properties, stopped working in February. The Crystal Palace, equipped with a Huntington mill, and largely developed, has remained unheard from. Development has been active at the Del Monte and the Indiana, small hoists having been installed at each place. No reports have been received from the placers of the district. The locality is in township 8 south, range 44 east.

Maid of Erin—The Maid of Erin is on Powder River, six miles south of the Sparta district proper. It is opened up on four levels by about 1000 feet of workings. A new ten-stamp mill has just been completed which is driven by water power brought two and a half miles from Powder River. Pat. Long is owner.

The Susanville District

This district is located west of the Greenhorn district near the intersection of the lines between townships 9 and 10, and ranges 32 and 33. The ore is practically all base, the best shipping qualities carrying 10 per cent lead, 200 to 400 ounces of silver, and one to two ounces of gold.

Placers are said to be fairly numerous, Elk Creek, Deep Creek, Onion Creek, and Big Creek,—all tributaries of the John Day from the north,—still being productive after years of working. Bear Creek and Camp Creek, emptying from the south, also contain pay gravels. It is said that the John Day gravels carry gold in sufficient

amount to justify dredging, and that other conditions are favorable for that class of work.

Some of the more active quartz properties not mentioned in detail below are the Princess, Gem, Chattanooga, and Stockton. The Monarch has a narrow streak of very rich ore. The Wilson group, owned by Heaton Bros., has likewise reported a good shoot. The Monitor is installing a five-foot Huntington mill.

Badger—This property is opened by a 650-foot inclined shaft with levels every 100 feet, and by a crosscut 1500 feet long tapping the mine upon the 500-foot level. The ores are concentrated and shipped, the matter of hauling the concentrates from this mine being quite an industry in itself. The mill consists of eight stamps, two sets of Cornish rolls, four jigs, five vanners, a breaker, several trommel screens, and an hydraulic sizer. The Badger Gold Mines and Milling Co. is the owning corporation. This company also owns the McQuade property, adjoining the Badger, and having 450 feet of drifts upon the vein. E. P. Kennedy is manager.

Bull of the Woods—Property of the Homestake Mining Co., E. P. Kennedy, Susanville, manager. The values are contained in pyritiferous quartz and calcite. The mine is opened by 240 feet of incline shaft and 400 feet of drifts. A hoist was installed in 1903.

Old River Channel Placers—Mr. C. J. Lane, of Galena, is the owner of this property. The gravels are removed by drifting upon bed rock, 20 feet below the surface, and sluicing the accumulation of the year each spring with snow water. A ten-mile ditch would supply water for regular hydraulic work. Location is in section 16, township 10, range 32.

Virtue District

This district lies about seven miles east of Baker City, and covers practically the whole of township 9 south, range 41 east. The principal mine in the district is now, as it always has been, the Virtue. The ore of the district is quartz carrying coarse gold with but a small amount of sulphides. Reports of activity upon the Mammoth, Brazos, Friday, and Cyclone have been received in addition to the ones described in what follows.

Emma—Improvements at this property during 1903 consist in the installation of a five-foot Bryan mill and a gasoline hoist. The mill was completed in May and has been in steady operation. The hoist is in service at a winze which is being sunk in the main tunnel 700 feet from the portal. The lower tunnel is in 1000 feet. W. L. Vinson is manager.

Virtue—The Virtue is one of the pioneer mining properties of Eastern Oregon. After a vicarious career of over 30 years the mine was acquired in 1898 by a Montreal company known as the Virtue Consolidated Mines Co., which worked it for a short time and then closed it. In 1901 operations were resumed under the direction of Arthur Buckbee, who transformed the property and pushed developments upon a large scale. A 1500-foot hoist was transferred from the Cumberland mine, Silver City, Idaho, to this mine, but was not erected. The old shaft is down 700 feet, but the present management is sinking a new triple compartment shaft which now has a depth of some 400 feet. Ingersoll drills are used in this work, and in the mining operations elsewhere. A 20-stamp mill reduces the Virtue's ore.

White Swan—This mine is famous in the annals of mining in Eastern Oregon as being the material basis of the great promotion scheme carried on by Letson Baliet a year or two ago. Some show of work was made upon the property in 1903, but late in the year the pumps were taken out and the mine permitted to fill with water. At last accounts labor liens were beng filed against the property by former employes.

The Mines of Harney County *

Fourteen localities are defined in Harney County having mineral deposits of sufficient worth to warrant legal locations being made within their limits. All of the locations indicated in what follows were filed subsequent to 1890. All townships are south, and all ranges east.

The Pueblo District—Located in townships 40 and 41, range 34. One hundred and fifty-nine claims are recorded.

The Idol City District—Township 21, range 32. Ten quartz claims and eight placer claims have been located.

Gold Gulch—Township 21, range 32. Five quartz claims.

Trout Creek—Township 21, range 32. Four quartz claims.

Stein Mountain—Unsurveyed. Twenty-six quartz claims, sixteen placer claims, and sixteen water rights,—all located since June 1, 1902.

Silvies—Townships 18 and 19, range 32. Four quartz claims.

* Special acknowledgement is due Mr. F. S. Rieder, county clerk of Harney County, for the information given here regarding the mining interests of that section.

Unnamed—Township 22, range 32. Thirty-eight claims prior to 1900.

Unnamed—Township 21, range 32. Two quartz claims, twenty placer claims.

Unnamed—Township 22, range 36. Six quartz claims.

Unnamed—Township 20, range 36. Twenty-nine placer claims.

Unnamed—Township 37, range 33. Twenty-five saline lands carrying borax.

Unnamed—Township 38, range 34 Seventeen quartz locations.

Unnamed—Township 25, range 35, all of sections 16, 17, and 21, —12 claims of 160 acres each for sapphires and other precious stones.

*Harney Mining District**—This district lies in section 32, township 20, range 32 east; and sections 4, 5, and 9, township 21, range 32. Placer deposits were found in Trout Creek, a tributary of Silvies River, in 1891, and have since that time produced $40,000 in gold worth $16.75 per ounce. The source of the gold seems to be a body of porphyry assaying $1.50 almost any where at the surface. Ledges have been found in which the quartz carries from $3.00 to $36.00 in gold and from one to eighty-four ounces of silver. Developments in the district in the way of tunnels and shafts amount to considerable more than 4000 feet. The oxidized zone extends to a depth of only 40 feet. The porphyry belt is about four miles long and one and a half miles wide, extending from southwest to northeast. It is surrounded by granite. All ore ever extracted, except a small amount shipped for milling tests, remains upon the dumps. The records of the county clerk show that 59 quartz claims and eight placer claims have been located in this district since 1890.

Mines of Crook County

Reports of activity on Ochoco Creek, section 30, township 13, range 20 east, have been received, where the Mayflower group, owned by the Oregon Mayflower Co., has been under development with Thron Thronson, of Howard, in charge. One hundred and thirty feet of vertical shafts, a 22-foot winze, 70-foot stope, and a tunnel, driven 1000 feet beyond the vein by a former management, constitute development. Values are in gold and silver, with an interesting variety of vein minerals.

On Bear Creek, near Crook, John C. Stain has some prospects carrying copper, gold and silver, the amount of development work

* This information regarding the Harney district was kindly supplied by Mr. O. J. Darst, of Burns.

not being given. Mr. Stain reports that the mineral interests in the neighborhood will be important when developed.

In the neighborhood of Crook, Richard Hurley is developing a property carrying gold and silver—the latter metal occuring as the chloride. Two hundred feet of open cut, 110 feet vertical shaft, and 90 feet of tunnel work describes development.

Near Ashwood, township 9, range 17 east, is a group of mines in the Trout Creek district. The following properties have been reported:

Oregon King—Oregon King Mining Co., J. E. Edwards, Hay Creek, manager; W. S. Thomas, Ashwood, superintendent. Developed by 520 feet vertical shaft, 1000 feet of tunnel, and numerous surface cuts. The ore is pyrite, chalcopyrite and blende carrying gold and silver. Although rather complex it is said that the ore is easily smelted. The mine is in active opperation again after two years of enforced idleness because of legal complications.

Red Jacket—Red Jacket Mining Co., Jos. Wood, manager. Two hundred feet of shaft and tunnels open the ore body. The gold and silver are associated with stibnite.

Ray—Ray Mining Co., E. P. Marshall, Pendleton, manager. Opened by three shafts 80 feet, 35 feet and 20 feet in depth, and by short tunnels. The ore is base, carrying gold, silver, pyrite, chalcopyrite, blende, and galena.

In addition to the above a considerable number of prospects are being developed, among which are the Ashwood, Antelope, Kimberley, Dexter, Oregon Queen, Gold King, White Butte, and others.

The Mines of Lake County

The gold and silver mines of Lake County are an unknown quantity. Rich specimens of gold, silver, copper, opals, topaz, and other minerals have been picked up by herders, it is said, and some ledges have been traced carrying low values in the precious metals. It is reported that these ledges are wide and long, but an absolute lack of means of transportation makes it scarcely worth while even to prospect them.

Gold in the Cascade Mountains

The Northern Cascades

Gold is occasionally found in paying quantities in the Cascades north of the Blue River district. Mining operations were important upon some of the northern branches of the Santiam in early days, but suffered a decline from which a recovery has been in evidence just in the last year or two. Some of the finest specimens of wire gold ever produced in Oregon came from the Santiam. Late discoveries seem to be of a base character,—copper, lead, and zinc figuring in many of the assay reports. The most northerly occurrence of gold in the Cascades is that reported at Chena Creek in Clackamas County.

The Chena Creek District—About one hundred claims have been located in the Chena Creek district, according to reliable information, of which about 20 are under development. Ores are of the character described above. The present energies of those interested are largely directed toward securing better roads into the district.

The Northern Light Mining and Milling Co. has a mining property upon Huckleberry Mountain, Chena Creek, near the mouth of Salmon Creek, eastern Clackamas County. The deposit carries silver, lead, copper and gold, and is exposed by a shaft 87 feet deep, and a tunnel 400 feet long. Water power is used in development. E. Renfer, 109 Grand Avenue, Portland, is president.

The Gold Creek Mining and Milling Co.—This is a Salem corporation owning a group of 13 claims in the Gold Creek district. The group is located upon the Little North Fork of the Santiam, Marion County, township 18 south, range 5 east. Development consists of 400 feet of workings. An electric drill, the power for which comes from an overshot wheel and a 15-kilowatt generator upon Gold Creek is used in development. Values are in copper, silver and gold. Sam Burghardt, of Elkhorn, is manager.

Sunnyside—This mine is located near the property just described. It is under development with C. G. Holt in charge.

The Freeland Consolidated—This mine has 50 feet of open cut, 84 feet of vertical shaft, 300 feet of tunnel, and crosscuts and drifts. Hugh Freeland is superintendent.

The Lewis and Clark Mining and Milling Co.—Three claims are owned by this company in the Mineral Harbor district. The ledge is opened by 250 feet of tunnels. F. M. Brooks, of Silverton, is president.

Humbug—Property of the Breitenbush Mining Co., J. J. Yackley, Detroit, manager. Township 9, range 6 east. Base ore carrying copper.

Greenhorn—This is a large free-milling deposit in section 6, township 10, range 6 east. One hundred and twenty feet of working tunnel and many open cuts constitute development. W. J. Smith, of Detroit, is manager.

Pride of Henlin—Located in township 8, range 3 east. It is owned by H. and J. L. Freeland, of Salem. The vein is said to be 40 feet wide, and carries lead, zinc, silver, and antimony. Opened by surface cuts, 64 feet of vertical shaft, and 80 feet of tunnel.

Mineral Cut—This property is located upon the C. and E. Railroad near Detroit. The ore is base. Opened by surface cuts and 100 feet of tunnel.

Albany—In the Quartzville district, township 10, range 4 east. It is opened by 1100 feet of tunnel, and is equipped with a ten-stamp mill. Frank Reed is manager.

Lawler—Another mine of the Quartzville district is the Lawler, of which R. E. Edson, Gates, is manager. Two thousand feet of tunnel work has been done. Ore is base. A 20-stamp mill is upon the property but is not in use.

The Mollala District—Upon Ogle Creek, a tributary of the Mollala, several prospects have been located and companies formed to work them. The gold is said to occur in a much decomposed quartz resembling kaolin. Specimens of wire gold several inches in length have been taken out. Some of the parties interested are the following: P. A. and John B. Fairclough; J. V. Harless; and F. D. Kepkey, all of Mollala.

The Blue River District

The location of this district, as defined by the miners themselves in their articles of organization, is as follows:

Township 14, ranges 2, 3, and 4; township 15, ranges 2, 3, and 4; township 16, ranges 2, 3, and 4, except the east half of township 16, range 4; township 17, ranges 2, 3, and 4,—all townships south, and all ranges east.

It is upon the watershed dividing the basin of the McKenzie from that of the Calapooia, 45 miles east of Eugene. It is reached by wagon road up the McKenzie from that place, as well as by road up the Calapooia from Brownsville.

The formations, according to Diller, are similar to those of the Bohemia district 50 miles to the south. The general course of the veins, according to this same authority, is north, 60° to 88° west, their dip being 75° to 90° southwest. The ores taken out up to the present time have been almost entirely from the oxidized zone. Concentrates from the Lucky Boy, which are probably typical, are said to carry only low values.

A very large number of prospects are under development, only a small number of which have been reported for this work. The most significant event of the year for the district has been the equipment of the Lucky Boy with a new mill, details of which are given below.

Anaconda Group—A. E. Wood and others are the owners of this property. It is developed by 40 feet of open cuts and 100 feet of tunnel.

Badger—Property of the Oregon Blue River Mines Co., of Philadelphia, W. L. Beckner, manager. Developed by a 300-foot tunnel upon the ledge.

Broncho and Burro—This property is developed by surface workings and 750 feet of tunnel. The ore is partly base. Dexter and Sparks are owners.

Cinderella—Owned by Thos. Brandon et al., of Halsey. The vein, which is said to have a width of 12 feet, is opened by a 50-foot shaft and 240 feet of tunnel.

Davis Group—John E. Davis, of Portland, owner. Three claims, water rights, and a mill site are included. The equipment consists of a mill house 20x40 feet, two crushers, and three arrastras.

Dean and Gilkey Group—Owned by Messrs. Dean, Gilkey, and Calkins. The vein is opened by a 50-foot vertical shaft and a 50-foot tunnel. Mr. T. C. Dean, of Monmouth, is manager.

The Doctor—Dr. C. F. Candiani, Italian consul at Portland, is owner. The ledge is said to be 35 feet wide. A small mill upon this property was destroyed by a snow-slide last winter.

Evening Group—Owned by J. E. McCauley, of Portland. The vein is opened by a shaft 50 feet deep, two tunnels, and many open cuts. Tunnel No. 1 is 112 feet below the summit, and has reached a depth of 250 feet; No. 2 is 128 feet below No. 1, and is now in 450 feet.

Glendale—Owned by Sam McConiga et al. One short tunnel has been driven. John Rucker is manager.

Great Northern—Property of the Great Northern Mill and Mining Co., of Brownsville. Fifty-six feet of vertical shaft and 200 feet of tunnels is the amount of development done. A two-stamp mill is in operation.

Happy Jack—Sam McConiga is owner of this claim. It is opened by 50 feet of open cuts and 90 feet of tunnel.

Hustler and Black Bear—Owned by A. E. Wood, of Blue River, who has proved a good vein by means of a 60-foot shaft and 1000 feet of tunnel. The ore in this mine is said to be mainly auriferous pyrite.

Keystone—Property of John W. Downer, who has made 50 feet of open cuts, sunk a shaft 22 feet in depth, and driven a short tunnel.

Lucky Boy—This is the principal mine of the district. It is opened by tunnels upon four levels at the present time, giving a depth of 400 feet. Four upraises cut all tunnenls. A new adit is to be run from the level of the new mill,—500 feet below the lowest tunnel now existing. The vein is very wide in places. A 15-stamp mill has been in continuous operation during the past year, but closed down for removal late in December. A new mill has been under construction during the year to be placed 500 feet below the present one, and to have 40 stamps instead of 15. Adjunctive appliances in the way of concentrators, crushers, and a cyanide plant for tailings will be parts of the new equipment, which will have a capacity of 150 tons in 24 hours. Power for the mill and for lights and mining operations will be secured from the McKenzie, water being taken from this stream two and three-quarter miles above the mouth of Blue River and conveyed by flume to the power plant, where a fall of 28 feet is secured. Victor turbines will develop 1100 horse power. A 500-horse-power generator comprises the initial electrical installation, which is being put in by the Westinghouse company. The Lucky Boy Mining Co. owns the property. T. C. Sharkey is manager.

Morning—Beckner and Merrill are the owners of this property. No details of development have been received.

Noonday Group—The five claims of this group are owned by Tate Bros. Development consists of 250 feet of tunnels and 100 feet of open cuts. An arrastra is in use for the reduction of the ore.

Ravena—This property consists of 11 claims and a mill site

owned by the Ravena Mining Co., of Portland. The vein is explored by 82 feet of tunnel, 240 feet of crosscuts, and 100 feet of drifts. C. P. Wright is manager.

Rambler—The Rambler Consolidated Mining and Milling Co., owner. Several cuts and a short tunnel constitute development work. J. H. Scott is president of the corporation.

Sun—Messrs. Holcomb, Washburn and others have developed this claim by three tunnels, 105 feet, 85 feet, and 30 feet in length respectively.

St. Louis—Dr. J. H. Kessler, of Portland, owns this property. It is described as a porphyry bluff 200 feet wide carrying low values, but with many stringers of rich ore.

Sunset Group—W. H. Dodge and C. Runyard have recently acquired this property. It is developed by 600 feet of workings and many surface cuts. A vein of good width is proved, and satisfactory values are obtained.

Treasure—This is at present the most extensively developed mine of the district. It is opened by a prospect shaft 30 feet deep, and by tunnels upon five levels. These workings, together with numerous upraises and crosscuts,—amounting to about 4000 feet in all,—prove a large ore shoot which steadily increases in size with depth. The ore is free-milling, the lowest level not having yet reached the limit of the oxidized zone. Development is still in progress. A stamp mill will probably be installed soon. C. H. Park, of Eugene, is manager.

Uncle Sam—Figures showing the amount of development work done upon this property are not available. It is equipped with a ten-stamp mill, which has been idle during the past year. Development continues, however, and a resumption of milling operations is promised.

Fall Creek District

A number of prospects are reported from Fall Creek, located in townships 18 and 19 south, ranges 3 and 4 east, Lane County. The Jumbo group has 200 feet of tunnel work done, and a contract let for 200 feet more. This is said to be the best developed property in the district. Geo. H. Delp, of Lowell, is in charge of the Jumbo.

The Bohemia District

The Bohemia district is located in township 23, ranges 1 and 2 east, partly in Lane County and partly in Douglas. It occupies a

portion of the westerly spur of the Cascade Mountains known as the Calapooia Mountains, the highest point of which is reached in Bohemia peak with an altitude of 6530 feet. At least four other peaks, however,—Fairview, Elephant, Grouse, and Grizzly peaks,—are in the immediate neighborhood of Bohemia peak, and have altitudes above 6000 feet. These altitudes are considerably greater than are to be found elsewhere in the Calapooias, so that the district is a prominent topographical feature of this section.

The nearest point on the Southern Pacific railroad is Cottage Grove which is 35 miles from the center of the district. A good wagon road covers the whole distance, 28 miles of which is a practically level stretch in the Row River valley. At the mouth of Sharps Creek the road forks, one branch making the ascent upon the southern slope of Hardscrabble Ridge, the other entering by way of Champion Basin. The latter branch was completed just during the past year. For two years the Oregon and Southeastern railroad has been under construction from Cottage Grove into the district. This railway is now completed for about 30 miles of the distance. It is expected that its ultimate terminus will be at the "Warehouse" on Frank Brass Creek, though it is said to be the plan of the Oregon Securities Co. to extend the track to the mill in Champion Basin belonging to this company,—electric traction being the proposed method of conducting traffic upon the severe grades existing between the points in question.

The veins of this district strike north 15° to 90° west, the average being about 60° west; the dip is in general from 60° to 85° southwest. The principal gangue material is quartz; the vein minerals associated with the gold are pyrite, sphalerite, galena, chalcopyrite, iron oxides, cerussite, millerite, and others. The oxidized zone is exceedingly variable in depth, the extremes being between a few feet, and perhaps 500 feet.

A considerable gold production has been accredited to the district in the past, but for two or three years every energy has been directed toward development, so that production during this period has been practically *nil.* The building of the railroad has stimulated activity to a remarkable degree, however, so that the condition of the camp is far better than ever before, and unless indications are seriously at fault a satisfactory output of metal will follow very soon.

It is stated that over 3000 claims have been located in the Bohemia district.

Anaconda—Owned by the Anaconda Gold Mining Company, of Bohemia, R. McMurphy, of Eugene, manager. Located upon Fair-

view Mountain. Developed by 50 feet of open cuts and 400 feet of tunnel work. The ore is free milling.

Baltimore—Ed. Jenks, of Bohemia, owner. This is a Fairview Mountain property opened by 200 feet of tunnels. The ore is base.

Belcher—Mr. Day, of Eugene, owns this property, which is to be found upon Johnson Meadows. It has 200 feet of work.

Benefit—G. G. Warner, of Eugene, is owner. It is located in Champion Basin. Opened by a tunnel 60 feet long.

Boston—Owned by the Bohemia Gold Mining Co., Geo. W. Lloyd, of Cottage Grove, manager. Opened by 60 feet of tunnel, and situated near Hardscrabble road.

Calapooia—The Calapooia-Bohemia Gold Mining Co., R. McMurphy, of Eugene, manager. The property is upon Windy Creek. Development consists of 100 feet of open cuts and 600 feet of tunnels.

Cripple Creek—Cochran and Gilbert are the owners of this property. It is situated upon Jackass Ridge and is opened by 200 feet of tunnels.

Crystal Consolidated—Owned by the Bohemia Gold Mining Co., Geo. W. Lloyd, Cottage Grove, manager. Located upon Fairview Mountain. Development consists of two tunnels each having a length of 200 feet. A saw mill was put in early in the year and a five-stamp mill is almost completed. A wagon road has been constructed which connects with the new road in Champion Basin.

Elephant Group—A. J. Howard, Cottage Grove, owner. Located upon Elephant Mountain, and opened by 100 feet of work.

Elkhorn—Andrew Brund and D. P. Burton are the owners of this claim. It has 800 feet of work.

Evening Star—Whipple Bros., owners. Located upon Grouse Mountain. Two hundred feet of development.

Glenwood—Owned by F. Hinds, Cottage Grove. Hardscrabble road. Three hundred feet of workings.

Gold Cross—Bohemia Gold Mining Co., Geo. W. Lloyd, manager. The location of this property is upon Noonday Ridge. A large ore shoot is developed by 800 feet of tunnels.

Gold King—This mine is the property of A. W. Zinikie. It is located on Horse Heaven Creek, and is developed by 300 feet of workings.

Gold Star—Peterson and Klucky own this claim, which is to be

found upon Fairview Mountain. Five hundred feet of development work has been done.

Golden Rule—The Golden Rule Gold Mining Co. is the owning corporation, of which Wm. Wechter, of Salem, is the manager. The claim is located at the foot of Hardscrabble road. It is opened by 100 feet of open cuts and by tunnels 70 feet in aggregate length.

Golden Slipper Group—Dr. J. P. Oglesby, of Cottage Grove, is manager for the Golden Slipper Mining Co. The holdings of the company are upon Horse Heaven Creek. Three hundred feet of work has been done in two tunnels.

Grizzly—Owned by the Grizzly Gold Mining Co., Dan Byrne, of Cottage Grove, manager. The location of the property is upon Grizzly Mountain. A good body of base ore is exposed by tunnels and a shaft aggregating 800 feet of workings.

Grouse Mountain—Owned by the Grouse Mountain Mining Co. Four hundred feet of work has been done.

Helms Bros.—The location of this property is at Ridge Hotel. Five hundred feet of development work has been done.

Henry Clay—Messrs. Whale and Gilbert, of Salem, are the owners of this claim. Location, Monta Rica Ridge. The ledge is opened by 1200 feet of work.

Hiawatha—Property of the Hiawatha Gold Mining Co., Alfred Johnson et al. Location is upon Fairview Mountain. The ore exposed by two tunnels and an upraise is said to be good. It is partly free and partly base. The development work amounts to 360 feet.

Iowa—Property of the Iowa Gold Mining Co. Location, Horse Heaven Creek. One hundred and fifty feet of development work.

Judson Rock—W. H. Blair, of Cottage Grove, is manager for the Judson Rock Mining Co. The property is located upon Fairview Mountain. Development to the extent of 400 feet is reported.

Knott—D. Ladd, of Bohemia, owns this Grouse Mountain property. An 80-foot shaft has been sunk.

LeRoy—Owned by the LeRoy Mining Co., LeRoy Bros., of Cottage Grove, principal owners. The property is located upon the Fairview slope of Champion Basin. The ore is practically all base. Eight hundred feet of tunnel has been driven. The mining equipment includes a small Leyner compressor and drill.

Mayflower—The owning corporation of this group is The May-

flower Mining Co., of which W. P. Ely, of Kelso, Washington, is manager. The property is situated upon Horse Heaven Creek. A wide ledge carrying values in gold, silver, copper, and lead is exposed by tunnels aggregating 1000 feet in length.

Montana—Reed and Fletcher are the owners of this group. Location, Grizzly Mountain; developments, 1500 feet.

Nemo—Owned by Gill Meadows and Charles Rutan. Located upon Grizzly Mountain. Two tunnels have been driven, the combined length of which is 500 feet.

Noonday—Noonday Mining Co., Herbert Leigh, Eugene, agent. Located on Noonday Ridge. One of the older properties of the district which has been developed by 4300 feet of tunnel, 500 feet of upraises, and by open cuts. A 20-stamp mill is upon the property, but operations are at a standstill presumably until transportation facilities are improved.

North Fairview—North Fairview Mining Co., Herbert Leigh, Eugene, manager. The location of this property is upon Fairview Mountain. It is opened by 1100 feet of tunnel and many open cuts. Oxidized quartz with occasional shoots of pyrite and galena are the vein materials.

Oliver Twist Group—O. G. Gilbertson, et al., owners. The group is located upon Jackass Ridge, and is opened by 200 feet of work.

Oregon-Colorado—Owned by The Oregon-Colorado Mining, Milling, and Development Co., F. J. Hard, Portland, manager. Location, junction of City and Annie Creeks. The ore body, which comprises a ledge seven to eight feet wide containing a pay streak two to five feet wide, is exposed by 1500 feet of tunnels and upraises. The ore is base, and a concentrating plant will be installed as soon as conditions will warrant this step. A wagon road has been built to connect with the Hardscrabble road.

Oregon Securities Co.—G. B. Hengen, Corn Exchange Bank Building, New York, secretary; C. C. Matthews, superintendent. Incorporated under the laws of New Jersey, this company has effected the consolidation of the Helena Consolidated Mining and Milling Co., the Music Mining and Milling Co., the Calapooia Mining and Tunnel Co., the Broadway Group, and other properties. The same interests are concerned in the construction of the Oregon and Southeastern railroad from Cottage Grove to Bohemia district.

The activities of the management have been directed largely during the past year toward a betterment of above-ground conditions at their properties with the apparent purpose of centralizing milling

operations. A mill with 30 stamps has been constructed in the Champion Basin near the site of the old Champion mill; an electric power plant has been installed upon Frank Brass Creek seven miles below with a capacity of 500-horse power; poles and wires have been strung; seven miles of good mountain road has been constructed from the "Warehouse" into Champion Basin, and a long wire tram, compressor pipe lines, etc., have been installed. In addition to these improvements much work has been done upon the long crosscuts being driven to the Musick and Helena mines through which ore will be brought by electric traction to the upper terminus of the tram for delivery to the mill. Milling will include amalgamation and concentration.

The Helena No. 1 is developed by some 7000 feet of work. Its ledge is to be tapped by the new working tunnel at a total depth, it is said, of 1800 feet from the surface. Details of development in the Helena No. 2 are not at hand. The Champion is an old mine, and 3000 feet of development is said to be the amount done in it. The Musick is the pioneer producer of the district; development is said to aggregate 7000 feet. The Broadway group is a comparatively undeveloped property with perhaps 900 feet of workings.

Peek-a-Boo—Billy Edwards and others own this property. It is located upon Jackass Ridge. Two hundred feet of workings are reported.

Rambler—The Rambler Consolidated Mining Co. is the corporation owning this mine. It is developed by a shaft 50 feet deep and a tunnel 250 feet in length. J. H. Scott, Crawfordsville, Ind., is one of the principal owners.

Rattler—Ben Pearson, of Cottage Grove, is the owner of this Jackass Ridge property. It is developed by 100 feet of workings.

Riverside—The Riverside Mining and Milling Co. is the owning corporation, of which F. J. Hard, of Portland, is manager. The mine is located upon Noonday Ridge, and includes a 4500-foot extension of the Gold Cross ledge. Development amounts to 700 feet. The ore is both free and base.

Scorpion Group—This group is located upon Horse Heaven Creek, and is the property of Jack Morgan and others. Development consists of 110 feet of tunnel workings.

Sears Group—Property of James W. Sears, of Bohemia. The group is located upon Grouse Mountain. Six hundred feet of development work has been done upon it.

Shane Group—Details of development upon this property are not

available. It is owned by W. H. Shane. Location, Monta Rica Ridge.

Sunrise Group—Owned C. A. Loveless, Fargo, N. D. Located upon Adams Mountain. Development amounts to 1200 feet of workings.

Sweepstake Group—S. J. Brund, of Bohemia, owns this group. It is located upon Elephant Mountain. Opened by 1000 feet of tunnel work.

Syndicate—Ed Jenks and associates have opened up this property upon Noonday Ridge by 250 feet of work.

Three Monte—Al. Churchill owns this claim. It is a Fairview Mountain location, developed by 250 feet of work.

United States Consolidated—C. J. Barhite, of Eugene, is largely interested in the mine. It is opened by 350 feet of tunnel work and numerous surface cuts.

Utopian Group—Alex. Pugh and associates are developing a group by this name upon Elephant Mountain. Three hundred feet of tunnel work has been done.

Vesuvius—Owned by the Vesuvius Gold Mining Co., F. J. Hard, of Portland, manager. This is one of the most extensively developed properties to be found upon Fairview Mountain,—2300 feet of tunnels and upraises having been made within a continuous body of oxidized ore. Within the last few months the Stocks and Harlowe property adjacent to the Vesuvius has been acquired by the management of the latter. A five-stamp mill was included in this transaction, and this has been renovated and put to work upon the ore taken out of the Vesuvius during development.

Wall Street—S. G. Davidson, of Portland, is owner of this claim. It is located upon Grouse Mountain. Five hundred feet of development work discloses a body of good base ore.

White Iron—Two hundred feet of work has been done upon this property of J. B. King which is located upon Elephant Mountain.

Winchester Group—J. I. Jones, of Cottage Grove has developed this group by 400 feet of work. It is to be found at Johnson Meadows.

Gold and Silver in Douglas County

The most significant mineral deposits of Northern Douglas County are comprised within the limits of the Bohemia district, and

have been described above. Gold occurs at intervals, however, along the eastern and southern borders of the county.

Dodson Butte District—In the vicinity of Dodson Butte, about 12 miles southeast of Roseburg, are some copper prospects which have received considerable development. They are described by Diller in the Roseburg Folio,—No. 49 of the U. S. Geological Survey. The Black Republican and the Yankee Boy properties have received the largest amount of development. No reports of activity have been received from them for 1903.

North Myrtle Creek—Placers have been worked upon this creek for many years. The McClellan placer near the mouth of Lee Creek is equipped with a No. 1 giant which is supplied with water through a two-mile ditch. The Porter placer, in the same locality, is similarly equipped.

South Myrtle Creek—A number of ledges have been under development about 12 miles above the town of Myrtle Creek. A practically level road covers this distance. The veins run almost parallel with the valley, and are exposed in the ravines cutting down to the flood plain of the stream. The tunnel levels are run at but a few feet elevation above the wagon road.

The Continental is owned by Mr. B. W. Stewart, of Portland. It is opened by 400 feet of tunnel which exposes a five-foot vein carrying values in gold associated with iron and copper sulphides. Some ore shipments have been made from this mine with satisfactory returns.

The Hall mine is under the management of John Hall, of Myrtle Creek. It has 200 feet of development. Its ores are similar to those of the Continental.

The Little Chieftain is under the management of Mr. C. O. White, of Myrtle Creek. Five hundred feet of development work been done upon the property, and six cars of ore have been shipped.

The Canyonville District—The area comprised within this district lies between Canyonville and Riddle. A number of placers are in operation each season, and at least one quartz mine is active. The minerals of the district other than gold are quite varied in character, —copper, chromite, asbestos, and others being found, but so far not in commercial quantities.

The single active quartz mine of the district is the Levens Ledge mine, which is the property of Portland people. It is opened by several tunnels upon the vein. A five-stamp mill driven by gasoline power is in operation. J. T. Henwood is in charge.

Texas Gulch and Coffee Creek—Coffee Creek empties into the

South Umpqua some twenty miles east of Canyonville. It, together with a small tributary, Texas Gulch, was the scene of sensational placer mining in early days. It is said that the production of gold from this single locality ran in a short time into the tens of millions, and that the place possessed for a while all of the characteristic features of a frontier mining camp. The place is practically deserted now, only two or three miners being at work. Many attempts have been made to locate the ledge from which the gold was derived, but all have failed.

During the past summer a giant was installed to work the gravels upon the Umpqua at the mouth of Coffee Creek, and a three-mile ditch and flume was built to supply the necessary water.

The Drew Creek District—Elk Creek is a tributary of the South Umpqua a few miles east of the mouth of Coffee Creek. Flowing into Elk Creek near Drew postoffice is the stream known as Drew Creek upon which several copper-gold prospects of note are under development.

The most extensively developed of these is the Rainbow, which has received about 2500 feet of work under the direction of Mr. H. Banfield. This gentleman, in addition to this comparatively large amount of admirably executed mining work, has constructed a number of buildings upon the property, and several miles of road into the camp. It is his purpose to install a reduction plant in the near future.

Four miles to the south of the Rainbow mine is the Rowley property, which is opened by about 300 feet of tunnel. It is similar as to the character of its ores to the Rainbow. Mr. A. Rowley, of Portland, is owner.

The Green Mountain District—Starveout Creek is a tributary of Cow Creek about a dozen miles above Glendale. Upon this stream, and in other places adjacent to Green Mountain, a number of comparatively unimportant gold producing properties are to be found. At least one extensive placer is in operation, however, but no direct information has been obtained concerning it.

Cow Creek Placers—A few miles below Glendale Cow Creek Canyon has its beginning and extends for 30 miles or so to the north. Upon the steep sides of this canyon old channels are occasionally to be found and frequently may be worked at a profit. The only extensive plant among these is that of the A. B. C. Mining Co., which is located about six miles from Glendale. It operates two or three giants, and controls several miles of ditch.

GOLD IN SOUTHERN OREGON

The territory included within the area usually designated as "Southern Oregon" is practically that defined by the drainage basin of Rogue River. It comprises by far the greater portions of Jackson, Josephine, and Curry counties, and is covered, at least in its parts which are productive of mineral wealth, by an old range of mountains which has been named by J. S. Diller, of the United States Geological Survey, the "Klamath Mountains," though upon the maps these are known, according to location, as the Coast Range Mountains, the Rogue River Mountains, and the Siskiyou Mountains. This territory includes the pioneer mining districts of Oregon, the placers upon Jackson and Josephine creeks having been discovered and worked in 1852, at least ten years earlier than the placers of Eastern Oregon.

From that date until the present time placer mining has continued to be the principal form of the mining industry in this part of the state. For the reasons set forth in the article "The Distribution of Placer Gold in Oregon," by Mr. C. W. Washburne, printed in the earlier pages of this book, it may be seen that these placer deposits might have accumulated even in the absence of strong vein formations. That such formations do exist, however, seems at the present time to be unquestionably established. The utter lack of adequately developed properties until within the last year or two seems to have been the only reason for the idea which so long prevailed that only "pocket" deposits of gold existed. The fact that really valuable quartz deposits have remained so long without attention is largely the result of peculiar local conditions.

In addition to the gold deposits of the district, commercially important deposits of copper are known and exploited. The main copper localities are at Waldo, though the metal is found upon various tributaries of the Illinois. Just across the California line extensive deposits are said to occur which may in time become important. A California corporation, the Waldo Smelting and Mining Co., was actively engaged last year in developing the Waldo deposits, and under another name, The Oregon and Pacific Railroad Construction Co., was promoting a railroad line from Grants Pass to Eureka, California. The completion of this road will mean much to the mining and timber interests of this region.

Within the last year or two considerable interest has been manifested in the matter of saving the values in platinum metals which are associated with the gold in certain of the placers. These metals are said to occur within a belt extending from the Galice placers southwest to Waldo.

There would seem to be an excellent field in Southern Oregon for dredging operations, and it is probable that the future will see a notable development of this form of mining. An account of the present status of this industry has already been given.

The Althouse District

The Althouse district is about 40 miles southwest of Grants Pass in township 40 south, range 7 west. It is one of the pioneer mining camps of Oregon. Its important mines are all placers.

Grass Flat Placer—Property of Geo. Layman and Wm. Neil. Located four miles southeast of Browntown.

Kiphart Placer—Located seven miles from Browntown. Alex. Kiphart, owner.

McDowell Placer—Five miles from Browntown. Property of Ed. McDowell.

Martine Placer—Located upon the right fork of Althouse Creek nine miles from Browntown. Chet Martine, proprietor.

Althouse Mining Co.—This property, which consists of 600 acres of ground, is located on the Althouse three miles from Holland. The gravels are 25 feet in depth,—15 feet of this being pay dirt. A six-mile ditch is under consideration which is to deliver 2000 inches of water under a head of 500 feet. Robert Brown, superintendent.

Dale Hill Placer—This is an 80-acre property located one mile from Holland. The gravels are reported to be from 25 to 30 feet in depth and to carry pay throughout. Nine miles of ditch supply two giants under a head of 125 feet. Six men are employed. T. F. Rourke, of Portland, manager.

The Applegate Mining Districts

Applegate Creek and its tributaries have long been productive of placer gold, and in a few instances quartz properties have also been exploited. In general the numerous mineral localities of the Applegate basin have taken their names from the creeks or gulches upon which they are found. In the discussions which follow, the various properties will be grouped according to their occurrence in this way, while the order of treatment will correspond to the manner in which the tributaries enter,—proceeding down-stream.

STEAMBOAT CREEK MINES

Steamboat Creek rises in Grayback Mountain, southern Josephine County. Placer operations have been inaugurated recently in at least two new places, and one or two older properties have again

taken up development. The district is difficulty accessible, but prospects are said to be good.

Missouri Mining Co.—The properties of this company lie well up toward the summit of Grayback Mountain upon Steves Fork of Steamboat Creek,—four miles of the bed of this stream being included. The gravels are said to have a depth of 15 feet and to be very rich. An abundant supply of water is available. A large force of men has been at work during the past year getting the mine into shape for its initial run this winter. Owned by M. O. Warner and E. O. Smith, of Eugene, and Messrs. Wallace and Newkirk, of Portland.

The Oro Grande—This is a companion property of the Missouri Mining Co. on Steves Fork of Steamboat Creek. Like the property just mentioned the Oro Grande is a new one, and just this year has been equipped for work. Its 500 acres of ground is reported to be fabulously rich. One No. 3 giant is working at present, but two more are to be installed in the near future. A double shift of men is at work night and day.

STERLING CREEK

The Sterling Placers—Property of the Sterling Mining Co. Located on Sterling Creek, a small stream flowing south into the North Fork of the Applegate. It is about eight miles south of Jacksonville. Several hundred acres of ground are included in the property, the placer portions of which consist of a deep red clay-gravel deposit. The equipment includes a 25-mile ditch carrying 2500 inches of water nine months of the year and supplying it at a pressure of 250 feet. Two giants; water power derrick operated by a Pelton wheel; and other accessories. Henry Ankeny, of Jacksonville and Vincent Cook, of Portland, are the owners.

THOMPSON CREEK

Maid of the Mist—On Thompson Creek the Maid of the Mist mine is being developed by Messrs. Thurston, Clute, Phelps, and Cleland, who have a bond upon the property,—the owners being Messrs. White, Thurston, and others. A fourteen inch vein is being developed by a shaft and tunnel which represent some 500 feet of work.

WILLIAMS CREEK

Williams Creek is in eastern Josephine County and is a southern tributary of the Applegate. The district formed by the mines which cluster about this stream and its branches is approximately 20 miles south of Grants Pass, and in townships 38 and 39, range 5 west.

Layton Hydraulic Mines—Jack Layton, a pioneer miner of Southern Oregon, operates two placer mines in the Williams district. One lies on Bamboo Gulch, a tributary of Williams Creek, the other upon Farris Gulch, which empties directly into the Applegate. The properties comprise nearly 500 acres in all. They are operated with water from two ditches heading in Williams Creek and aggregating 35 miles in length. A large reservoir is an adjunct of the Farris Gulch property.

The Eccentric—This mine is situated well up on Horsehead Creek, a branch of Williams Creek. It is said to have a fair sized vein carrying good values. A long development tunnel is being driven at present by F. H. Osgood, who has the property in charge.

Bone of Contention—Located one mile from Williams. Three tunnels, 80 feet, 200 feet, and 700 feet long respectively, have been run upon the vein. The formation is reported as a contact between a quartz porphyry and diorite. An eight-stamp mill upon the property has a capacity of 15 to 20 tons per day. Catterlin and Johnson, of Portland, are owners.

MAPLE GULCH

Lucky Cuss—This mine is located upon Maple Gulch, 12 miles south of Grants Pass. Owned by the Gold Point Mining and Milling Co., but bonded and under development by W. T. Cope and F. W. Chaussee, of Grants Pass. It was taken up recently as a worked out mine, but in the two tunnels that have been run the operators claim to have uncovered a ledge of good ore.

Golconda—Near the Lucky Cuss mine is the Golconda, which is under development by Ladd and Bourne, of Portland.

OSCAR CREEK

The Jewell and Moore Placers—Located on Oscar Creek, a small northern affluent of Applegate Creek ten miles southeast of Grants Pass. The property is noted for its big nuggets. Water not plentiful. Equipment is a reservoir, pipe, and one giant. L. L. Jewell and Dr. J. S. Moore, of Grants Pass, are the owners, F. M. Hayes, superintendent.

THE MINES OF MISSOURI FLAT

Missouri Flat is a mineral locality located upon the north side of the Applegate opposite the mouth of Williams Creek.

The Mountain Lion—A ledge of good width has been extensively developed at this property. A five-stamp mill and Woodbury con-

centrator are in use. Owned by Jewell, Harmon, and Bailey Bros., Grants Pass.

THE MINES OF SLATE CREEK

Slate Creek flows into the Applegate from the west in the vicinity of Wilderville, township 37, range 7 west. The ores found in this place are mostly base, copper values figuring prominently in the assays. A number of locations have been made, but no extensive development has been done.

Ramsey and Ingram—This property, which has been bonded by Samuel Bowden, is said to have a ledge 100 feet wide and 1600 feet long.

Copper Eagle—J. C. Mattison is in charge of this property and is doing development work.

THE ASHLAND DISTRICT

The Ashland mining district includes the Bear Creek basin south of Medford, Jackson County. The principal mines are on Ashland and Wagner Creeks.

Shorty-Hope—Three miles northwest of Ashland on Wagner Creek are the six claims of this company. Nearly 2000 feet of tunnels, shafts, and other workings have demonstrated the extent of the ore body, which is said to be composed of bluish quartz with values both free and base. Water taken through a mile and a quarter ditch from Wagner Creek gives power for operating the ten-stamp mill on the property. The Shorty-Hope Mining and Milling Co., Ashland, owns the mine and is pushing development.

Whale Ledge—The Whale Ledge is upon Wagner Butte near Ashland. It is being developed by the Western Star Gold Mining and and Milling Co., which has developed a strong ledge said to carry good values.

Ashland—This is a splendidly equipped property located two miles west of Ashland. It has a ten-stamp mill, hoist, and other adjuncts. The depth attained in some thousands of feet of workings is 900 feet. It has not been worked during the past year.

Barron—The property of Barron Bros., and located nine miles southeast of Ashland. Sufficient development has been done to disclose a large body of ore, though nothing of note has been reported from the mine during the past year.

Oregon Mining Co.—This company has acquired water rights on Wagner Creek five miles west of Ashland, and is installing a new five-stamp mill to reduce the ores from a group of seven claims.

Briggs Creek District

Briggs Creek has its source in the watershed dividing the Rogue from the Illinois, and empties into the latter in township 37, range 9 west. It is distant from Grants Pass about 30 miles. The properties in operation are mostly placer mines. Interesting copper deposits, especially upon Butcher Knife Creek, have been reported.

Connor Placers—One hundred acres are included in this property, —the land lying in the bed of Red Dog Creek. Water is obtained by means of a ditch one mile in length which delivers 2000 inches with a head of 150 feet. Two giants are in use. J. A. Connor, of Grants Pass, is owner.

Old Famous Placers—One hundred acres of ground adjacent to Briggs Creek is included in this property. Two ditches, one mile and three-fourths of a mile in length respectively, supply 2000 inches of water at a pressure of 150 feet. One No. 1 giant. The gold varies from fine to nuggets weighing an ounce. Kerchoff and Preston, of Grants Pass, owners.

Bain Placers—Two ditches supply 2000 inches of water at a pressure of 80 feet. J. T. Bain, of Grants Pass, superintendent.

Miller Placer—One hundred and twenty acres of placer ground belongs to this property. The water supply consists of 2500 inches which is brought through one and one half-miles of ditch and supplied at a pressure of 150 feet. One No. 2 giant, and 1000 feet of hydraulic pipe. R. F. Miller, Grants Pass.

Barr Placer—One hundred and forty acres of ground is worked by means of water brought through a three-fourths mile ditch and used at 100 feet pressure. One No. 2 giant and 1000 feet of pipe. John Barr, proprietor.

Eureka—Upon Soldier Creek, in the Briggs Creek neighborhood, is the Eureka mine, one of the best producers at the present time in this part of the state. The vein maintains a width of from six to fourteen feet, and carries good values. A ten-stamp mill is in operation. In charge of A. F. Nelson, Selma.

The Galice District

Galice Creek is a tributary of the Rogue flowing into the latter from the west in township 34, range 7 west. The district is approximately 25 miles from Grants Pass. Its placer mines have been worked for many years, and are estimated to have yielded twelve

million dollars. It is only during the past year that a road has been opened into the district.

The Galice Consolidated Mines Co.—In September a consolidation was effected whereby the Galice Hydraulic Mines Co. and the St. Helens and Galice Mining Co. came under one management and assumed the above name. The holdings of the company include some six hundred acres of placer ground. The equipment includes 10 miles of ditch and one and one-half miles of pipe line, yielding, in conjunction with a system of reservoirs, a water supply lasting ten months. New quarters for the men have been constructed, the races have been deepened, and many other improvements have been made. A. B. Cousins, of Portland, is manager.

The Old Channel Placers—This is another of the old placers of the district. It is equipped with two giants operating under a high pressure with a good supply of water. Twelve to fifteen men employed. Mr. J. R. Harvey is manager.

Harmon and Green Placers—This property is owned by T. K. Anderson. It is equipped with three miles of ditch which supplies 3000 inches of water under a head of 150 feet. Two giants, one No. 2 and one No. 3, are in use. Gold is heavy. The gravel banks are 60 feet high.

Lost Flat—Five quartz claims are included within this property. Ore is float quartz carrying high values, which are recovered by the use of an arrastra. Work is now in progress by which it is hoped to discover the ledge from which this material came. Wm. and Chas. Crow are owners.

Reeves and Williams—Located two miles from Galice. The ore is said to carry workable quantities of gold and copper. Development slight.

Savage and Son—Located upon the Rogue four miles below Galice. A two-foot ledge of free milling gold ore has been opened. Five claims are in the group.

Golden Wedge—This property is located on Rogue River four miles below Galice. It is of interest from the fact that the surface float from the vein has been worked for years in a primitive way with good returns. It was purchased in the fall by Thien Bros., of Seattle, who are operating the two-stamp mill and making further developments.

BIG YANK LEDGE

Striking across the Rogue three miles below the mouth of Galice

Creek is a contact ledge which has long attracted attention for its remarkable size. The "Big Yank," as it is called, is said to be from 25 to 250 feet wide, and to extend for 12 miles across the country. Values in copper, gold and silver are carried in a bluish quartz heavily impregnated with pyrite. Gold and silver assays are reported at from two dollars to thirty-six dollars per ton; a small percentage of copper is present. A similar ledge known as the Big Chieftain is said to run parallel to the Big Yank about a mile to the west.

Almeda—Four claims upon the Yank ledge are developed by the Almeda Mining Co., J. F. Wickham, of Portland, manager. Two tunnels, 350 and 200 feet long respectively, and a crosscut of 70 feet constitute the work done so far. One hundred feet of solid ore is reported, which is said to carry four to six dollars in gold and silver, and six per cent of copper. It is reported that a 100-ton smelter has been ordered.

The Yank Group—The Yank Group consists of five quartz claims and sufficient placer ground to make 500 acres in all. It is located upon the Big Yank ledge across the river from the Almeda, and is being opened up under the direction of Mr. W. F. Cope. The placers are equipped with three miles of ditch and two No. 2 giants working under 500 feet head. The ledge is opened by 600 feet of workings.

Gold Hill District

The town of Gold Hill is situated upon the Rogue River in township 36, range 3 west. A number of streams and gulches enter the river valley in this vicinity both from the north and from the south. It is upon these streams, for the greater part, that the mines of the district are located, and it is convenient to classify them for descriptive purposes according to their occurrence upon one creek or another. Of the streams coming in from the north Evans Creek is the farthest west, emptying into the Rogue at Woodville. Next to the east is Wards Creek, which is followed in order by Sardine Creek, and Water Gulch, the last being east of Gold Hill. On the south, and in order from the west, are to be found Foots Creek, Galls Creek and Kanes Creek. Kanes Creek empties just opposite Gold Hill, and it is in the territory immediately east of it that the Blackwell district is located. All of these streams have yielded largely in placer gold, and are still productive. Foots Creek is said to have a flood plain two miles wide by six long, the gravels of which prospect fifty cents a yard in gold. It is to be the scene of extensive dredging operations this year.

An enterprise that means much to the vicinity of Gold Hill is the one undertaken at Tolo by Dr. C. R. Ray, representing the Condor

Water and Power Co. A dam has been constructed across the Rogue at this point with the object of securing power for all purposes and water for placer work and irrigation. A 20-foot fall is available, which it is calculated will yield 10,000 horse power. The initial installation consists of two 700-horse-power turbines and one 250-kilowatt generator. The power immediately available will first of all be used in the development and working of the mining interests which the Condor company controls in the vicinity.

Another enterprise has been revived after some years of dormancy which will be of great significance when completed. The High Line Ditch, having its proposed terminus at Gold Hill, will take its waters from the Rogue four miles above Prospect, making the total length of the conduit 123 miles. Surveys have been made and considerable work has been done. A head of 400 feet will be available at Gold Hill, which, with the great capacity of the ditch as proposed, will give large facilities in the way of power, lumber transportation, and placer and irrigation operations.

EVANS CREEK

Homestake—This mine is located one mile west of Woodville near the mouth of Evans Creek. It has been worked for 18 years by various persons, but is under bond at present to Eastern capitalists with J. R. Cunningham in charge. Development consists of 340 feet of main tunnel and a winze 75 feet deep. The ledge is said to be 20 inches wide with walls of dolomite. The ore is complex, iron sulphides, galena, and arsenopyrite being the main minerals.

WARDS CREEK

Olsen Placers—Water is supplied at a head of 140 feet through one and one-half miles of ditch.

Golden Chloride—A ledge four and one-half feet wide has been opened upon this property by a 125-foot tunnel.

SARDINE CREEK

Several placers are situated upon this creek, all of which are equipped for work with water supplied through ditches from one to two miles in length, and delivered at about 100-foot pressure. The ones that have come to notice are the Dusenbury, Smith, Ketchum, and White placers.

Lucky Bart Group—Six claims are held in this group. Development consists of a tunnel 700 feet in length. A five-stamp mill is upon the property.

Hinkle—A five-foot ledge upon this claim has been opened by a tunnel 350 feet long. A two-stamp mill reduces the ore.

Carter—This property is developed by a tunnel 250 feet in length and by a shaft 100 feet deep.

Miller, Reed and Owens—Developed by 100 feet of tunnels and a 30-foot shaft. An 18-inch vein of free milling ore is exposed, for the reduction of which a five-stamp mill is in operation.

WATER GULCH

Hayes Placer—Five miles of ditch supplies water at 125-foot pressure for operations at this mine.

Hebert—A 40-foot shaft has been sunk at this property upon a ledge said to be 19 feet wide.

Shook—The ledge is reported to be four and one-half feet wide at this mine. It is explored by 140 feet of tunnels.

Three Sisters—One hundred feet of tunnel work is the amount of development accredited to this mine.

White Horse—A four-foot vein at this property has been opened by a tunnel 350 feet in length.

FOOTS CREEK

Champlin Dredging Co.—A full account of the equipment of this company, together with details of proposed operations, has been given on page 22.

GALLS CREEK

Duncan and Anderson—Opened by a 60-foot shaft.

Omah—The Omah Gold Mining and Milling Co., J. E. Kerr and associates. Three short tunnels have been driven, the lower of which is in 268 feet. The ledge is three to four feet wide,—walls are lime and porphyry.

Quartz Mountain—The Quartz Mountain Consolidated Gold Mining Co., J. E. Kerr and others. Three short tunnels constitute development.

Bill Nye—Developed by a shaft 80 feet deep and several tunnels. The equipment includes a hoist, pumps, and a five-stamp mill, all of which are newly installed.. Major D. R. Andrus is manager.

Kubli—Located opposite the Bill Nye. A 400-foot tunnel gives access to the ore bodies, which are said to be in three parallel veins. Twelve claims are in the group. A two-stamp mill is in operation.

Last Chance—Two hundred feet of tunnel work has been done at this mine.

Red Oak—Development is similar to that at the Last Chance.

Tin Pan—Two hundred and fifty feet of tunnel work opens the six-foot vein.

Burns and Duffield—One and one-half miles of ditch delivers water at a head of 150 feet.

KANES CREEK

Braden—This property is two miles from Gold Hill. It comprises both quartz and placer claims to the extent of 800 acres. Five parallel veins are said to exist. Three thousand feet of tunnel work develops the ore deposit, and a ten-stamp mill is in operation. The crushing plant will soon be increased to twenty stamps, however, and other improvements made. Owned by the Condor Water and Power Co., Dr. C. R. Ray, manager.

Roaring Gimlet—This consists of a group of three claims developed by a 100 foot shaft. A gasoline hoist and pump are part of the equipment. The pay-streak is two feet wide. The mine has been a good producer.

Alice—Six hundred feet of development has been done exposing 14 feet of low grade ore.

Carr—A 100-foot shaft has been sunk upon the three-foot vein of this property.

Mabelle—A 300-foot tunnel opens the four-foot ledge at this mine. A roll mill of 30 tons capacity is in service.

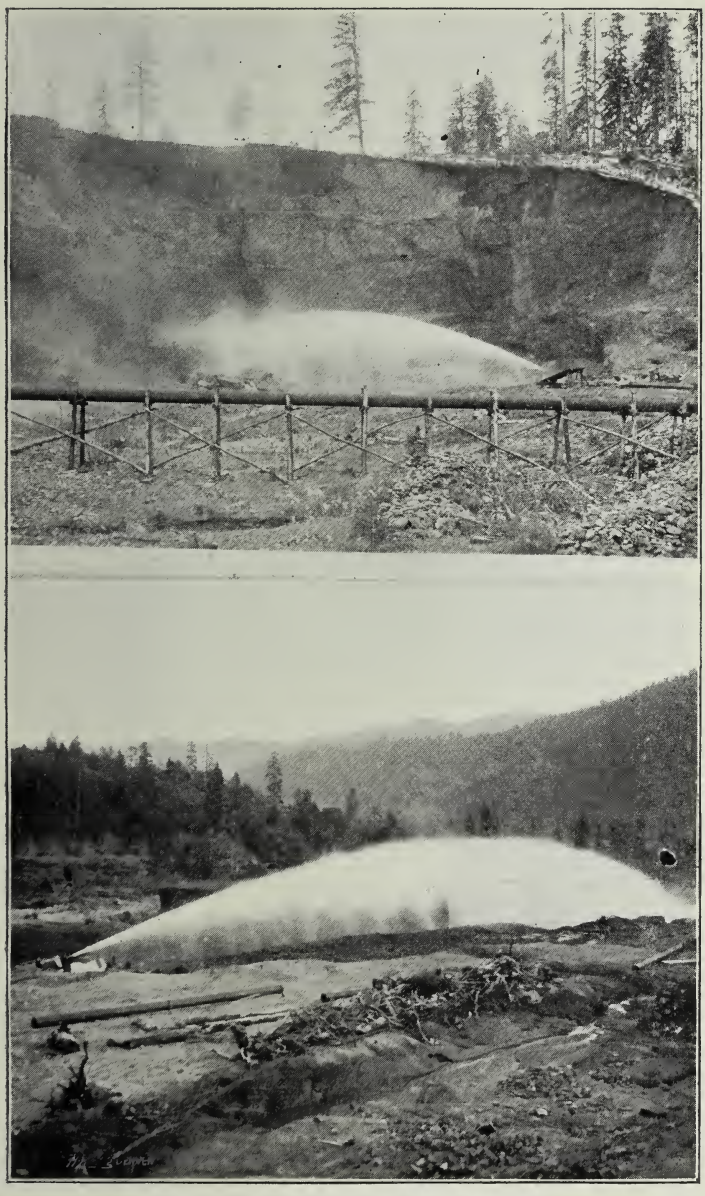
McDougal Placer—Six miles of ditch brings water at a 300-foot head for operations at this mine.

BLACKWELL DISTRICT

McDonough—Developed by 350 feet of tunnel which indicates a four-foot vein.

Yellow Jacket—A three-foot vein has been proved upon this property by 350 feet of tunnel.

Bowden—This mine is an old "shipper" which recently changed hands and has since that time been undergoing farther development. It is opened by a shaft now down 140 feet. The vein is two and one-half feet in width. A steam hoist and a five-stamp mill are features of the equipment.



OLD CHANNEL PLACER, GALICE DISTRICT.

GOLDEN DRIFT MINE, "DRY DIGGINGS," GRANTS PASS DISTRICT.

Johnson—Development upon this property amounts to 300 feet of tunnel work. A four-foot ledge is defined.

Blackwell—Twelve claims are included in this property. A four-foot ledge is opened by a 60-foot shaft.

Graham and Braden—A three-foot vein of excellent ore is opened upon this claim by a 200-foot shaft.

Nellie Wright—The width of the ledge upon the Nellie Wright is reported as five feet. A shaft 60 feet deep opens it.

Tolo—This property adjoins the Blackwell on the north. The group consists of six claims. A steam hoist and power drills are parts of the equipment. The Condor Water and Power Co., owner.

JACKSON CREEK

Opp—The Opp mine is located near Jacksonville. It is an old property which has recently been taken over by an eastern company. A large stamp mill is promised for the near future.

Cement Placers—Located upon Jackson Creek. A No. 1 giant is in use. Thos. Williams, owner.

FORREST CREEK

Oregon Belle—This group consists of 14 claims owned by the New York and Western Mines Co., of Amsterdam, N. Y., Foster and Gunnell, of Grants Pass, local representatives. The vein is upon a contact between porphyry and slate, and is from twenty inches to three feet in width. An ore shoot 200 feet long has been developed which is being tapped by a tunnel to be 1500 feet long when completed, and which will give a depth of 350 feet. A 42-inch Huntington mill is in operation.

Sturgis Placers—This property includes nearly 1400 acres, a large proportion of which is workable old channel ground. The mine was sold in December to A. Vance, of Los Angeles, for $25,000 and re-equipped. Three ditches give excellent water facilities; a donkey engine and derrick are used to handle boulders; two No. 3 giants are working night and day,—an electric lighting plant being in use for the night work. W. R. Olmstead is in charge.

Coffman Placers—Four hundred acres of land adjoining the Sturgis Placer is included in this property. A mile and a half of flume was put in in 1903, and water sufficient for the operation of three giants secured. E. A. Spaulding, of Tacoma, owner. L. C. Crippen, of Medford, manager.

Antonio Placer—One No. 1 giant is operated upon this property at a pressure of 210 feet. Dumping facilities are excellent. Robert McGill is manager.

Grants Pass District

The Golden Drift Dam—Three miles above Grants Pass a dam is being built across the Rogue by the Golden Drift Mining Co. for the purpose of securing both water and power. Sixteen 46-inch turbines are to be used under a head of 20 feet for working the mining properties of the company in the immediate vicinity, while an installation equally large will supply power for outside consumers. Ten thousand horse power will be developed in all. Four 18-inch five-step compound centrifugal pumps will supply water for placer work at the Dry Diggings. It is the purpose of the company to construct one canal upon the south side of the river and two upon the north, making a large area of arid land available for cultivation. The enterprise is being carried out under the supervision of Mr. M. C. Ament.

The Dry Diggings Mine—The Golden Drift Mining Co. owns a large area of placer ground extending back from its dam into the foothills. Included in its holdings is the well known Dry Diggings locality comprising about 1000 acres, and long famous for its big nuggets. But a small amount of water is available for working the ground, however, and it was primarily for the purpose of securing this very necessary adjunct to placer operations that the big dam was conceived.

Dowell Mine—The Comstock Mining and Milling Co. is working this property at present. It is located three miles east of Grants Pass upon Mt. Baldy. A shaft is being sunk which is now down 60 feet, and a crosscut is being run to reach the granite contact upon the west. The vein is from three to five feet in width; ore is mainly base, yielding, however, some free gold. A hoist is in course of construction. The company developing the property is a close corporation of which Chas. F. Crow is president, and J. Monroe Layman is manager.

May Queen—This group is also located upon Mt. Baldy and is being developed under the supervision of A. A. Cameron. A five-foot vein carrying base ore is reported.

Jewett—Located three miles southeast of Grants Pass. Property of Benjamin Healey, of San Francisco. No details.

Owl Gulch—The location of this property is seven miles east of Grants Pass. A ledge one foot in width has been opened by a tunnel 110 feet long. Shaska and Robinson, owners.

Grave Creek District

Grave Creek rises in township 34, range 4 west, and flows almost directly west for 25 miles to the Rogue. It receives in its course a large number of small creeks and gulches both from the north and from the south, all of which contain more or less placer gold, though ledges are found only at the head of the main stream. The only large tributary is Wolf Creek, which flows by the side of the railroad for a half dozen miles north of Leland, to empty into Grave Creek near that place. Coyote Creek is an affluent of Wolf Creek. In the discussion that follows the streams will be taken up in the order of their occurrence proceeding up stream from Rogue River.

Harris Flat—Located upon Rock Creek. Five miles of ditch brings water at a head of 125 feet.

Blaisdell—A high bar upon McNair Flat is under development by means of tunnels. Six hundred acres of ground.

Vindicator—One giant under 300 feet head is at work at this property. Located at the junction of Wolf and Grave Creeks. W. M. Gearhart, manager.

Archer—Located opposite the Vindicator. A nine-mile ditch supplies one giant at a pressure of 125 feet. G. B. Archer, owner.

Steam Beer—This mine is located across Wolf Creek from the Vindicator. One giant is in service which is supplied with water at 200 feet pressure from a ditch nine miles in length.

Lower Lewis—Located near Leland. Two five-inch giants operate under a head of 85 feet. Good buildings have been erected for the use of the workmen. E. A. Parlin, superintendent.

Upper Lewis—This property, also known as the Goff mine, is located one mile above Leland. Two No. 3 giants are in use. Water under a head of 240 feet is supplied by 17 miles of ditch. J. C. Lewis, owner.

Browning—Located opposite the town of Placer. Ground sluicing property. D. L. Browning, owner.

Taylor and Kremer—A three-foot ledge has been opened at this mine by three tunnels which give a depth of 150 feet. It is located one mile above the Greenback mine.

Vulcan—Located one-half mile from the Greenback mine. A drift 245 feet in length has been run upon the vein, two upraises have been made, and considerable ore has been stoped. A modern three-stamp Merralls mill is now being installed together with a Wilfley

table. This mill is to be driven by a 52-inch Pelton wheel operating under a 45-foot pressure. F. Clements, owner.

Greenback—This mine is located just above the Columbia placers. It is eight miles from Leland, and twenty miles in air line north of Grants Pass. It was discovered in 1897, equipped with five stamps in 1898, five more in 1899, and another five in 1900. This plant is located at an adit to the fifth level, and ten stamps of it are still operating upon ores stoped above it. Early in 1903 a new mill was completed at the mouth of the ninth level on Tom East Creek. It is equipped with 30 stamps, four Wilfley tables, and a cyanide plant for tailings. Power is furnished by two nine-foot Risdon wheels under a head of 400 feet. A steam power plant is available for the months during which water is scarce. The mining equipment includes a ten-drill compressor, hoist operating between the third and fifth levels, and an electric light plant. The ore occurs in a well defined vein which is said to be but one of nine parallel veins to be found within a distance of 1200 feet. Eight thousand feet of development work has been done. One hundred and twenty-five men are employed. The Greenback vein is supposed to be the richest although not the widest. Values are 85 per cent free. Mr. C. W. Thompson is manager. Owned by the Greenback Gold Mining Co., an eastern corporation.

Columbia Placers—Located upon Tom East Creek adjoining the Greenback mine. Two miles of Tom East Creek is included within this property, enough virgin ground being available to last for many years. The property is a thoroughly modern one, having 21 miles of ditches which give 5500 miners inches of water at a head of 250 feet; four giants with five-inch nozzles; 5000 feet of pipe; two lines of sluices, one 350 feet long and the other 1100 feet long; and other hydraulic accessories. An average of 1800 cubic yards of material is moved each 24 hours. Allen and Lewis, Portland, owners; Frank Ross, superintendent.

Morning Star Mine—Located one-quarter mile southeast of Placer. C. F. Howe, owner. Development work has exposed a three-foot ledge.

Auten—Location, six miles northeast of Placer. The ores are treated in an arrastra. Auten and Bogue, owners.

St. Peter Group—Located one mile north of Greenback. Willard Young, the owner, has opened a two-foot ledge by tunneling.

Yellow Horn and St. Elmo—Opened by 400 feet of work in tunnels and shafts. Considerable ore has been milled from surface workings at the Vulcan mill. R. E. Brom, owner.

Mines of Wolf and Coyote Creeks

At the station of Wolf Creek upon the Southern Pacific railroad Wolf Creek receives its principal tributary, Coyote Creek. A number of mines, both placer and quartz, are to be found upon the headwaters of each stream.

Scribner and Henderson—Located upon Wolf Creek. A great porphyry dike 100 feet in width is reported, which carries high values in free milling ore. The deposit is one of considerable promise, though it is worked as yet only by two arrastras. It is operated by Joseph Dysert.

Olympia—This property is developed by two tunnels upon the vein 70 and 90 feet long respectively, and by surface cuts exposing the ledge for 400 feet. The shoot is eight to sixteen inches wide, and carries both free gold and sulphides. J. B. and E. F. Hannum are owners.

Old Vet—A 13-foot ledge upon a serpentine-porphyry contact is reported at this mine. Base ore predominates. A crosscut is being driven to tap the vein. Coburn and Finch, Grants Pass, owners.

Hardscrabble—An extension of the Old Vet. Two claims are comprised in the group. Two hundred and fifty feet of working tunnels and shafts expose an ore body two to four feet wide carrying both free and base ore.

Lehman Placer—Consists of six claims, which, for lack of water and dumping facilities, are exploited by drifting upon bed rock. Six hundred feet of drifting has been done. A. D. and D. Lehman.

Ruble Placer—This mine extends for some four miles along the bed of Coyote Creek and comprises about 240 acres. It is equipped with three giants, 6000 feet of pipe, eight miles of ditch, and two Ruble grizzly elevators which are 10 feet wide, 40 feet long, and six feet high. Water right for seven months. S. Ruble, owner.

Blalock and Howe—Located upon Coyote Creek six miles from Wolf Creek station. A sensational strike was made upon this property during the fall just past, though considerable gold has been taken out for several years. The drift upon the property is in only fifty feet, and at present shows sulphides upon the face. The ledge is said to be in line with the Greenback vein one and one-fourth miles to the southwest. Vein materials are quartz with some calcite and barite. A two-stamp mill is in use at present.

Thompson Group—This property is being developed by the New

York and Western Mines Co., Foster and Gunnell, Grants Pass, local representatives. The vein is said to be eight feet wide.

Sluter Mine—Seven miles northeast of Wolf Creek. The ledge is said to be well defined, and carries iron and copper sulphides together with free gold.

Wolf Creek Mining and Development Co.—Both placer and quartz propositions are in course of development by this company. Placer operations are being carried on at different places for a distance of six miles upon the creek, while at the quartz mine an ore body seven feet wide is exposed which is increasing in width with depth. M. B. Bosworth, of Portland, manager.

Anaconda—Located one mile from Golden. John D. Wilcox, Portland, owner.

Jump-off-Joe District

Jump-off-Joe Creek has its headwaters some twenty miles northeast of Grants Pass, and flows westward to the Rogue. A group of mines near the head of the creek includes several properties showing considerable activity.

Oro Fino—This mine is located upon the divide betweeen Jump-off-Joe and Louse creeks. It is an old producer which has been taken up recently for more extensive development. Twelve hundred feet of development has been done in all,—600 feet of which is in the lower tunnel. J. T. Chase has the work in charge.

Baby—Located nine miles north of Grants Pass and owned by the Capital City Gold Mining Co., of Sacramento, C. C. Higgins, manager. Opened by tunnels and drifts aggregating 750 feet. Tunnel No. 1 is in 200 feet; No. 2 has a depth of 350 feet. Country rock is a dark colored diorite; ore is free and base. Equipment is a three-stamp mill.

Dick—Owned and operated by Jacob Meier and associates. The vein is an extension of the Gopher. Ore is treated in an arrastra. A tunnel is being driven to tap the vein at a lower level.

Gopher—Located one-half mile from the Baby. It is the property of the Gopher Gold Mining Co., of San Francisco, a close corporation, J. W. Wright, president, T. R. Dean, secretary, T. E. Lacy, manager. It has been worked for four years, and is opened by a tunnel 500 feet long, together with 1500 feet of crosscuts, drifts, etc. A 10-horse-power hoist is in use. Ore is base. A three-stamp mill and Triumph concentrator are in place.

Cook and Howland Placers—Fourteen miles northeast of Grants Pass. Ground is shallow and easily handled as shown by the fact that four acres can be removed each year by the use of one four and one-half inch nozzle under a 250-foot head. Three miles of ditch with a capacity of 1000 inches, and a reservoir, give the water supply. Two No. 3 giants are in use, together with 2000 feet of pipe. Arthur Howland, superintendent.

Hammersley—This mine is reported to have produced $200,000 in the course of various attempts that have been made to operate it, —bad management and endless litigation being responsible for the failures. It has recently been taken up by Mr. F. H. Osgood, of Seattle, who is pumping out the workings and putting the five-stamp mill into shape for work. The ledge is said to be from one to three feet in width, and all freemilling ore. It is also said to be in direct line and dip with the Greenback ledge.

Clark Placers—The old Booth-Dysert placers were purchased last year by J. K. Clark and thoroughly re-equipped. Much placer ground, and two farms are in the property,—the total amount of land involved being 777 acres. Two No. 3 giants under 400 feet head are in service. An electric lighting plant makes it possible to continue work through the whole 24 hours.

Lucky Queen—Three claims are in the group, which was first worked 35 years ago. Two thousand feet of development work has been done. It is again active under the management of C. D. Crane.

Kerby District

The town of Kerby is situated upon the Illinois River in town-39, range 8 west. It is of great historical interest from the fact that it was the center of the mining interests of Josephine County in early days, and at one time the county seat. Placer gold is mined upon the streams flowing into the Illinois in the vicinity of the place, and a number of quartz properties are under development.

Imbler and Isaacs—This firm owns two mining properties upon the headwaters of the Checto, about fifteen miles northwest of Kerby. One of these is a ledge carrying values in copper, the other a placer yielding coarse gold as well as the platinum metals. One giant is in operation. The gravel is six to eight feet in depth.

Tennessee Gulch Mine—Located three and one-half miles from Kerby. Charles Schasson, of Kerby, owner.

Free and Easy—This mine is located two and one-half miles from Kerby. J. F. Stith, owner.

CANYON CREEK

Canyon Creek is a tributary of Josephine Creek about seven miles west of Kerby. A small amount of placer work is being done upon it at present, and in addition some ledge deposits said to carry high values in sylvanite are under development. F. H. Osgood operates one of the placers. It is equipped with two giants.

JOSEPHINE CREEK

Josephine Creek is a tributary to the Illinois about seven miles northwest of Kerby. Its course is nearly parallel to the latter, however, so that its basin lies west of Kerby, from which it is distant five miles. Both quartz and placer mines are under exploitation.

Flintlock Placer—Located five and one-half miles northwest of Kerby. A ditch four miles long gives water service under a head of 220 feet for eight months; a ditch one mile long supplies water for by-wash. Ground consists of bars 30 feet above the present level of the creek bed. Gravels are composed of large and medium wash, and are about 12 feet in depth. A seven-acre tract is now being worked for which a sluice 500 feet long is necessary. Naucke and Stith are operators.

Morrison Placer—A high gravel bar is being worked at this property by means of one giant. The dump is excellent but water supply is deficient. M. A. Morrison and Sons.

Gold King—Three claims are in this group, which is located three miles above the mouth of the creek. Two shafts 28 and 18 feet in depth have been sunk upon the pay shoot of the seven-foot ledge. Values are said to be partly in tellurides. A two-stamp mill is in use. M. Mark and W. I. Evans are owners.

Mud Flat Placers—Equipped with a ditch one mile long which supplies 1000 inches of water for eight months under a head of 225 feet. Gohres, Smith and George, owners.

ILLINOIS RIVER

Wilson and Meredith Placers—Located six miles north of Kerby. The property includes 200 acres of ground upon both sides of the Illinois River. Operations are upon a bar of thirty acres upon the east side. An acre worked out in 1899 is said to have yielded $15,000. Three acres is a season's run. The equipment consists of a ditch seven miles long from Fiddlers Gulch and other gulches along the way which gives a capacity of 2500 inches at a pressure of 185 feet; one No. 3 giant, two No. 4 giants, and one No. 5. giant; and a Ruble grizzly. A special under-current device has been installed by the

Clevinger, Photographer, Grants Pass.

HYDRAULIC ELEVATOR AT THE COLUMBIA MINE, GRAVE CREEK DISTRICT.

Waratah Minerals Co. for the purpose of recovering the platinum values associated with the gold. E. Wilson, owner.

Six Mile—A placer property located eight miles from Selma. Old Channel Mining Co., Myron Harrison, foreman.

Louse Creek Mines

Louse Creek is a small tributary of Jump-off-Joe Creek rising about six miles north of Grants Pass, and emptying at Merlin.

Forest Queen Placer—Owned by J. P. Pipes and T. Weisenbacher. This property, formerly known as the Lance placer, has 212 acres of ground, two miles of ditch, 2500 feet of hydraulic pipe, a Ruble elevator, and three giants. Water pressure is 200 feet. The location is six and one-half miles from Grants Pass upon the Louse Creek road. J. P. Pipes manager.

Granite Hill—Property of the American Gold Fields Co., of Chicago, W. J. Morphy, manager, L. B. Wickersham, superintendent. Located nine miles from Grants Pass. Both placer and quartz grounds are included in the 800 acres held by the company. One giant fed by a four-mile ditch is in operation upon the placer gravels at present, an hydraulic elevator being used in conjunction. Of the several ledges upon the property, but two are under development, the Red Jacket and the Granite Hill, the latter being the one upon which work is now being concentrated. It is opened by a shaft to three levels which are at 107, 207, and 307 feet respectively. Sinking is in progress with the immediate object of reaching a depth of 500 feet. The vein is from two to eleven feet wide; country rock is granite; strike of vein is northwest. A steam hoist, pumping plant, and six drill compressor are in service as parts of the mining equipment. Fifteen stamps are now installed, while a new mill is in the course of erection which is to have a capacity of twenty stamps. A 100-horse-power steam plant supplies power.

The Mines of the Lower Rogue

A territory that is but slightly explored as far as its mineral resources is concerned is that of the lower Rogue River basin. Reports of gold, silver, copper and platinum are current, but there is a most decided lack of definite information concerning the prospects.

Near the mouth of Mule Creek, in northeastern Curry County, Captain E. B. Burns, associated with Charles Ladd, of Portland, has installed a five-stamp mill to work the ores of the Mule Moun-

tain mine. A tunnel 200 feet long and a shaft 100 feet deep disclose the ore body, which is said to be excellent.

Across the river from the Mule Mountain mine is the Keystone, owned by George Billings. It is opened by 185 feet of tunnel.

At Half-Moon Bar, in this same locality, A. E. Frye has 85 acres of gravel 15 feet deep which prospects well, but no appliances for working the deposits have been installed as yet.

Mt. Reuben Mining District

The Mt. Reuben district lies between Reuben Creek and Whiskey Creek in township 33, range 8 west. It is reached by way of Glendale, a wagon road having been completed recently from that place to the Benton mine. The distance from Glendale is 18 miles.

Lewis Group—The eight claims in this group are owned by John Lewis. The vein has been opened by 2000 feet of tunnels.

Ajax—Development work to the extent of 1200 feet has been done upon this property. A two-stamp mill is a part of the equipment.

California—Developed by shafts and tunnels aggregating 700 feet of workings. Owned by Cline, Lewis, and The Gold Bug Development Co.

Copper Stain—Property of Dana Bros. Opened to a depth of 500 feet by tunnels and a shaft which makes a total of 2500 feet of workings. A steam hoist is used in the development, and a ten-stamp mill has been installed.

Gold Bug—Property of Senator Jones and brother, of Nevada. A ledge of free milling ore five feet wide is opened to a depth of 500 feet by tunnels aggregating 1800 feet, and a shaft 300 feet deep. The equipment consists of a hoist, five stamps, cyanide plant for tailings, electric light plant, and pumps. Schuyler Cole, superintendent.

Kremer and Palmer—Located near the junction of Whiskey Creek and Rogue River. Opened to a depth of 200 feet. The ledge is five to eight feet wide and is said to be all good ore. A ten-stamp Parker rotary mill is in operation but will be replaced by an ordinary ten-stamp mill in the near future. Willis Kremer, manager.

Benton Group—Eight claims are included which are opened by 2000 feet of tunnel work. The ledge is from one to eight feet wide. R. A. Jones, superintendent.

Silver Creek District

Silver Creek has its sources on the opposite side of the divide from Galice Creek, and flows into the Illinois twenty-five miles to the west. The upper portions of the district are approached by way of Galice; the lower portions are accessible by way of the Briggs Creek district.

Silver Creek Hydraulic Mine—This property is located three miles west of Silver Creek Falls. Two and one-half miles of ditch supplies 2000 inches of water at a pressure of 300 feet. A dump of 80 feet into the creek is available. One No. 2 giant is used. The depth of the gravel is 30 feet. Mangum and Stock, Grants Pass, owners.

Waxahachie Hydraulic Mine—This mine is located upon the Illinois 32 miles from Selma. It includes 240 acres of ground, the gravel deposits upon which have a depth of 30 feet. Values are in gold and platinum. Water is supplied through a ditch two miles long at a head of 225 feet. One No. 2 giant is in use. A dump of 80 feet into the Illinois is had. Mangum, Rehkopf, and Co., Grants Pass, owners.

In addition to the above the following placers have been reported, but no details are given. They are located about 20 miles from Galice: The Clark and Terry placers; the Silver Creek Basin placers; Cobel and Henson placers; and Crott's placer.

Sucker Creek District

Sucker Creek is tributary to the Illinois from the east,—emptying two miles or so west of Althouse. Its lower reaches are accessible from Kerby and Althouse, while the upper parts of the basin are nearer Williams.

Sucker Creek Mining Co.—This company—a close corporation,—is working California Bar, situated at the lower terminus of Sucker Creek canyon, nine miles above the mouth of the stream. The property consists of 250 acres of placer ground, and was purchased in July by the owning company. The equipment includes a 25-horse-power engine, double drum hoist, overhead cables, centrifugal pump, etc. Eighteen men are at work. H. Warner is manager.

Shade and Thornwaite—Located seven miles from Holland. J. F. Thornwaite, manager.

Wisecarver Placer—Three miles from Boland Creek, 12 miles from Holland. J. F. Wisecarver, manager.

Engles and Creed Placer—Located upon Boland Creek A. A. Engles, owner.

Ducommon—Located two miles south of Holland. Six claims are included in the group. Tunnel No. 1 cuts the vein 148 feet from the portal at a depth of 50 feet; No. 2 is in 375 feet, and reaches the vein at a depth of 175 feet. Values are in gold and copper. S. E. Ducommon, owner.

Waldo District

The Waldo district is located upon the very southern limits of the state, its copper fields, particularly, extending over into California. It has produced placer gold since early days, and lately has experienced something of a boom in connection with its copper deposits. With the completion of the proposed railroad from Grants Pass through this region to Eureka, California, the mineral industry of the district will doubtless assume significant proportions.

The Waldo Smelting and Mining Co.—This corporation, under the management of Col. T. Waln-Morgan Draper, of San Francisco, has been quite active in the development of its properties, these being dormant at the present time, however, pending the completion of the railroad mentioned above. Veins are said to be up to 150 feet in width and to carry values in copper and gold. The working center of this company is at Takilma, four and one-half miles southeast of Waldo. A wagon road and telephone connect this place with Grants Pass. Mr. C. L. Tutt is in charge at Takilma.

Simmons, Logan and Cameron—This placer is located two and one-half miles northwest of Waldo. The ground is composed of thick horizontal strata of clay beds, together with thick seams of fine gravel. A Hendy elevator No. 1 has been installed. Seven thousand feet of hydraulic pipe is in use. J. M. Logan, manager.

Allen Gulch—Located one mile southeast of Waldo. Two giants are in use, the first piping to the second, which drives the material into the sluice. Eleven miles of ditch gives water service for seven months. Seven hundred acres in the property. F. H. Osgood, owner.

Smith-Beer Placer—Located upon the Illinois River seven miles from Waldo. Oscar Beer, manager.

The Deep Gravel Mining Co.—The holdings of this company,—formerly known as the Wimer placer,—are located at Waldo. Two ditches, two and four miles long respectively, furnish water for one giant and a No. 2 Hendy elevator, the later raising the material four and one-half feet by means of a pressure of 190 feet. Pipe line is 24 inches at the penstock, but reduces to 18 inches at the pit. A feature of the mine is the outlet race. This is 7000 feet long and 60 feet

deep, and includes nearly 300 feet of tunnel. A part of the placer ground is lower than this outlet, however, and to assist in working this the elevator mentioned above was installed last summer. A shaft to prospect the deeper gravels found bed rock at 70 feet,—43 feet of this distance being through pay ground. E. A. Reames is secretary of the company owning the mine, and W. J. Wimer is manager.

Vulcan Copper Co.—The holdings of this company include the Sowell group which was purchased recently from the Mountainview Copper Co. Several hundred feet of tunnels and drifts have been run in the way of development work. A 30-ton Vulcan smelter is upon the property, but is not in use.

Gold and Silver Upon the Oregon Coast

The southern part of Curry County has been prospected, as yet, only in the most superficial way, and but little can be said regarding its mineral resources. Beginning with the northern half of township 35, and extending north to township 23, are the Port Orford and Coos Bay quadrangles, the geology of which has been thoroughly worked up under the direction of J. S. Diller, U. S. Geological Survey Folios 89 and 73. The eastern limit of these quadrangles is the meridian of 124° in range 11 west.

BEACH MINING

Immediately upon the coast in both Curry and Coos counties gold has been extracted from the black sands concentrated by the wave action of the winter storms. These black sand deposits are to be found not only upon the present beach, but also upon the borders of the costal plain, sometimes four miles from the ocean, and at altitudes up to 200 feet. Investigations carried out several years ago by Messrs. Sharpless and Winchell* show that the gray sands carry an average value of 7.2 cents per ton, while the average of the black sands examined was 54 cents. The gold is native, and occurs in excessively thin, cup-shaped scales, of which 600 colors are required to make one cent. The matter of saving such values is a vexing one, and much experimenting has been done with perhaps no distinctly satisfactory solution of the problem. In addition to the gold, variable values are found in the platinum metals, besides perfectly crystalline garnets rubies, and iron minerals.

Beach Mines in Curry County—Two mines,—the Blanco mine and the Sixes mine,—have been described by Mr. Diller, but no reports of activity during the past year have been received from them.

*A Geological Reconnaissance in Northwestern Oregon; Diller; U. S. Geological Survey Ann. Rep. 17.

The Blanco is located in section 4, township 32, range 15 west. Sluices 500 feet in length, and seven burlap tables are used in saving the values.

The Sixes mine is near the line between sections 27 and 34, township 31, range 15. It is upon the eastern border of the costal plain at an altitude of 200 feet.

The Beach Mines of Coos County—Farther north in Coos County the Randolph district, comprising the entire coast limit of township 27, has been quite productive. At the present time two mines are in operation, the Confidence, and the Rose. The old Pioneer mine at the head of The Lagoons, as well as the Eagle and Sprague-Warner mines,—all old producers, are not now worked. The black sand deposit lies at the foot of a bluff, 200 feet above sea level, and 30 feet above the plain level. In the language of Mr. Diller: "The belt of black sand is about 150 feet in width. In cross section it is lenticular in shape,—about four feet thick in the middle, tapering to an edge upon each side, with the coarsest material, including the gold, near the landward border, where it is highest and represents the most vigorous wave action. . . . . The black sand is composed chiefly of garnet, magnetite, ilmenite, and chromite, with a smaller amount of zircon, epidote, and a few other minerals. . . . . Platinum with iridosmine is locally found in recognizable quantity among the heavy concentrates."

The Confidence mine is being worked under the supervision of C. B. Zeek, of Bullards. Fifty sluice boxes of special construction, the details of which are not reported, are used. The gold amalgamates, while the platinum, which is present in large quantity, is saved "by special method."

No report was received from the Rose mine, beyond the statement that it is again in operation after a long period of idleness.

Beach Mining North of Coos County—Above the Randolph district no other beach operations have come to notice upon the coast except at Otter Rock, eight miles north of Newport, where B. F. Jones, of Toledo, is interested. Mr. Jones states that the method of mining is with old-fashioned sluice boxes, with blankets to catch the gold. Probably 20 per cent of the values in gold and platinum are saved. The platinum product is about 25 per cent of the total. A man working eight hours will take out from $1.50 to $2.00 per day. The black sand varies from one to five feet in depth. Values are not found farther than two hundred feet away from the base of the bluff, which leads to the conclusion that the precious metals are simply concentrated by wave action during the winter storms from the

materials produced in the natural weathering of the loose sandy bluffs. These bluffs are from 20 to 100 feet high. The same beach has now been mined over for eight seasons with the same production, showing that the storms invariably bring back about the same amount of gold and platinum.

At the mouth of the Columbia River, upon the authority of Dr. August C. Kinney, of Astoria, gold occurs in the Clatsop sands widely disseminated and in quantities sufficient to pay for working them. Newspaper reports to the effect that the sands from dredging operations at the mouth of the Columbia were to be "sluiced" to test this statement have not been confirmed.

MINES INLAND FROM THE COAST

Inland from the coast a number of metal bearing areas are known. The most important is probably the Johnson Creek-Sixes River district extending north of west in township 32, and through ranges 11, 12, 13, 14, and 15. According to Diller placer mines were active in the Johnson Creek district before 1890, in which year a series of disastrous land slides so filled the streams that further operations have been impossible.

Salmon Mountain Mine—At the head of Johnson Creek upon Salmon Mountain the Salmon Mountain mine is being operated under the supervision of Geo. T. Hall, of Eckley. Water under 200 feet head is secured from Johnson Creek. Some ledges upon the property have been developed by 1000 feet of tunnels. A small arrastra is used to reduce the ore taken out.

In the same neighborhood a company organized by Ira Buzan has completed a new flume and made other arrangments for work upon a large scale.

Near Rusty Butte, just west of Salmon Mountain, Harrison Bros., of Myrtle Point, have a group of claims upon which considerable development has been done, and which have yielded some returns from ore treated in arrastra.

Between the forks of Sixes River and the mouth of Edson Creek several placers are said to be in operation upon high bars. No details concerning these properties are at hand.

WEST FORK DISTRICT

Considerable activity has been in evidence during the past two years at the headwaters of the West Fork of Cow Creek, in township 32, range 10. The district is isolated and difficulty accessible, so that developments are necessarily slow. The following are the most important of the prospects:

Crystal—Richard Dick and Wm. M. Porter, Camas Valley. White quartz carrying free gold. Developed by a short tunnel.

Prolific—E. K. Cluster and A. E. DeGroot, Camas Valley. Ore body is three feet of decomposed quartz. A 15-foot shaft and a 40-foot tunnel compose development.

Eagle—Henry Martindale, Camas Valley, owner. Ledge 36 feet wide. Opened by a 40-foot shaft and a 30-foot crosscut.

Pearl—Same owners as the Crystal. A 60-foot tunnel has been driven.

Buckhorn—Walter Drane, Coquille, owner. A 20-foot shaft constitutes development.

Fifteen or more other claims are reported upon which assessment work is being done.

GYPSUM

The only deposit of gypsum which has received any development is that belonging to the Oregon Lime and Plaster Co., at Huntington. This deposit is described by Lindgren as occurring four miles from Burnt River, and eight miles from Huntington, near the summit of the ridge overlooking Snake River. The mineral is found in two beds, one of which is 20 feet thick while the other, 80 feet higher up, is 30 to 40 feet thick. A plant for the manufacture of plaster of paris is in operation.

Mr. W. G. Thomson, county clerk of Malheur County, is authority for the statement that a number of ledges are to be found in that county, which are unappropriated and easily accessible.

The mineral is also reported from Bear Creek, east of Prineville, Crook County.

INFUSORIAL EARTH

Very large deposits of this material are found east of the Cascades, but inquiries instituted by correspondence have failed to elicit sufficient data to permit the areas being plotted. It is known in a general way that the substance occurs along the Des Chutes River, where exposures many feet in thickness may be seen. It is reported from Wheeler and Malheur counties, while in Baker County, it is said to occur in large amounts in townships 13 and 14, range 37, east.

IRON

The best known iron deposit in the state is located about three miles from Oswego, a town upon the Willamette eight miles south of Portland. The following description is condensed from Diller's Geological Reconnaissance in Northwestern Oregon: The deposit is in the form of a bed about one mile long and a half mile wide. It is a bog deposit, formed upon a basalt floor by the decomposition of surrounding basalt slopes. Both the ore and its immediate covering of sand were covered at a later period by another flow of basalt. The ore is a limonite varying in hardness, color, and composition. Analyses are given showing as high as 54 per cent of metallic iron. Phosphorus varies from .666 to .392 per cent. Developments at the mine are said to consist of three slightly converging inclines running down the slope of the bed for nearly a thousand feet. Ore from this mine was reduced at Oswego as early as 1865, and in 1880 the yield of iron was 6,225 tons. According to one informant, the complete reduction plant now at Oswego started operations in 1888, ran continuously for something like three years, intermittently for two or three more, and then stopped. This result was probably due to a combination of circumstances,—the high price of fuel doubtless being an important consideration in the matter.

The Iron Mountain Coal and Iron Co.'s property is upon the North Fork of the Scappoose, 25 miles northwest of Portland. It is developed by an open cut 200 feet long, and a tunnel 50 feet long. A 50-horse-power water wheel furnishes power for some crushing and grinding machinery, the product being used as paint. Mr. F. Payne, of Scappoose, is managing owner.

Reports have been received of iron deposits in township 2 north, ranges 2, 3 and 4 west.

Mr. C. G. Caples, of Columbia City, has knowledge of several iron deposits in Columbia County, which, on account of their being located in close proximity to the coal beds of that region, should be of considerable interest.

Another iron locality is said to exist in Tillamook County, 15 miles east of Garibaldi.

Near Walker, Lane County, Mr. E. B. Simmons has a deposit of ferruginous material, suitable for the preparation of iron paint, and which he is getting into shape for production.

A considerable bed of iron ore derived from the oxidation of pyrite is found a mile or two above Gold Hill, Jackson County.

Another deposit of paint-making material is said to occur near Eagle Point, Jackson County.

LEAD

There are no mines in Oregon at the present time yielding lead to the exclusion of other metals. It is one of the most common constituents of the base ores of gold and silver, however, and in greater or less quantity occurs especially in the following districts: Bohemia, Quartzville, Shena Creek, Trout Creek, Spanish Gulch, Elkhorn, Cable Cove, Greenhorn, Quartzburg, Susanville, Sparta, Cornucopia, and Connor Creek.

LIME

This commodity is manufactured in Oregon for the local trade only. The largest producer is the Oregon Lime and Plaster Co., of Huntington. At Lostine, Wallowa County, the Lostine Lime and Marble Co., O. J. Poley manager, has a 500-bushel capacity kiln which gave a production in 1903 of about 1000 bushels of lime. Another kiln is said to be in operation at Joseph, Wallowa County. At John Day a kiln was formerly in use, but no information for the past year has been received concerning it. The White Swan marble mine on Cheney Creek, Josephine County, is preparing for the active production of lime, while other enterprises are being launched upon the marble deposits of the Applegate, having for their object the bringing out of both lime and marble. South of Gold Hill, upon Kanes Creek, Carpenter and Allison produced 6000 bushels of lime in 1903.

MERCURY

Cinnabar is mentioned by Lindgren as occurring in the Sumpter, Granite and Susanville districts.

Indications point toward the existence of a cinnabar deposit in the Coast Range in the western part of Yamhill County.

In township 1 north, range 10 west, Tillamook County, it is said that rich specimens of quicksilver ore have been taken.

Near Brownsboro, Jackson County, in section 12, township 36 south, range 1 east, Wm. Stanley has a quicksilver prospect upon which some work has been done with encouraging results.

Three miles south of Ashland some seams of cinnabar have been prospected, and a limited amount of mercury reduced for local placer work.

In the Meadows district of northern Jackson County, township 34, range 2 west, the Rogue River Quicksilver Mining Co., of Medford,

is opening a group of cinnabar claims. A 55-foot shaft has been sunk, and a tunnel started 150 feet below. Dr. J. M. Keene, of Medford, is one of the principal stock holders in this company.

Reed and Fletcher are also developing a cinnabar prospect in the Meadows district. A shaft 118 feet in depth has been sunk. The Mayfield property, in the same neighborhood, is said to have a large body of ore carrying one per cent mercury.

Good float cinnabar has been picked up on Cow Creek, Douglas County, and good specimens are also at hand from Pickett Creek, Josephine County.

A ledge of cinnabar is under development upon the South Umpqua, Douglas County.

According to Mr. W. B. Dennis, of Black Butte, Or., who has made the occurrence of quicksilver in the Northwest a special study, undeveloped deposits of cinnabar are found in the vicinity of Prineville, Crook County.

Elkhead Mine—Near Elkhead, township 23, range 4 west, an extensive deposit of the mineral exists owned by the Hovey Brothers, of Eugene. Several years ago a furnace was in operation at this property, but for some reason failed to recover the values properly, so that operations ceased pending improvements that have not, as yet, been undertaken.

The Black Butte Quicksilver Mining Co.—This is a Washington state corporation owning and operating the Black Butte mines, located upon a northern spur of the Calapooia Mountains in township 23, range 3 west. Black Butte Mountain, the apex of which is 1750 feet above the valley, seems to be composed of an altered andesite permeated by a system of fractures, along the planes of which the main ore deposition has taken place, the ore bodies attaining a width of from seven to twenty feet, and showing persistence both longitudinally and vertically. These planes dip at an average of 57° from the horizontal, the highest values lying next to the hanging wall. The occurrence of the cinnabar is not confined altogether to the fracture plains, however, but it is disseminated in small quantities throughout the main mass of country rock which therefore represents a very large deposit of low grade ore. The owners of the property expect to be able to recover the values from this portion of their mine as well as from the richer ore shoots. Over 12,000 feet of adits, upraises, shafts, and winzes have been opened, giving a vertical depth of some 1500 feet. Given shoots are said to increase in richness with depth. On levels down to the 400-foot level continuous drifts have been opened for more than 2000 feet along the course of the main fractures. Conditions are most favorable for cheap mining.

The property is at present equipped with a 50-ton Scott-Hutner continuous fine-ore six-inch-tile furnace of the California pattern. It is entirely inadequate for the work of reducing the ores of this mine, however, and will be augmented in the near future by a large plant with more modern appliances. The cost of treatment at present is 67 cents per ton. Many external improvements have been made upon the property with an evident eye for the beautiful as well as for convenience and utility. Mr. W. B. Dennis, of Black Butte, is managing owner.

MOLYBDENITE

This mineral is reported from Copper Creek, in the Eagle Mountains of Baker County, where a vein of white quartz stained with copper carries an occasional bunch of molybdenite. Mr. J. T. Tucker, of Burkemont, has knowledge of this deposit.

Mr. Henry J. Jory, of LaGrande, gives information of the occurrence of molybdenite in Glacier Park, Middle Eagle Creek.

The mineral is also said to occur upon Deer Creek, near Sumpter, and at the head of the Imnaha, over the mountain from the Cornucopia mine, where, over a district two or three miles square, it is found mixed with quartz.

In township 6 south, range 44 east, and near the location just described, is located the Drum Lummon group of mines, owned by the Whirlwind Gold Mining and Exploration Co., E. S. McComas, Portland, secretary. Five claims, mill site, tunnel site and water rights are included in the holdings of this company. Old workings upon the property penetrate an eight-foot vein carrying copper and gold, and in its center a streak of molybdenite said to be of sufficient purity and extent to make the deposit a valuable one.

The price of molybdenum has been advancing rapidly during the past year,—an ore carrying 50 per cent being worth now about $400 per ton. At this figure a good molybdenum mine is well worth consideration.

NICKEL

Traces of nickel, together with cobalt, are found upon the Malheur River, thirty miles from Ontario; in the vicinity of Johnson Mountain, Coos County; in the Standard mine at Quartzburg; in the Spanish Gulch district; associated with the deposits of pyrrhotite found on Upper Dads Creek, Cow Creek canyon, Douglas County; and at Rock Point, Jackson County.

The most noted deposit of nickel in the state, however, is located three miles in an air line west of Riddle, Douglas County. Piney Mountain, the place of the occurrence, is an elevated ridge composed according to Diller of saxonite,—a rock belonging to the peridotities,—situated within a belt of metamorphic rocks extending from southwest to northeast for unknown distances. The nickel area is small, being included, practically, within section 17, township 30, range 6 west. Exposures are high up on the mountain, and all prospecting has been confined to them. Developments are of the most inadequate sort imaginable, numerous open cuts, a half dozen short tunnels, and a few shallow shafts constituting the whole. The ore is here genthite or garnierite, a silicate of nickel and magnesium, which is found in a matrix of chalcedony. According to Dr. W. L. Austin, of Denver, who visited the region in 1895 and described it in a paper read before the Colorado Scientific Society, it occurs in veins and bunches which are quite generally distributed over the mountain with the exception of a barren area of about twenty acres. The veins in places are over eighty feet wide, and are of unknown depth. Much of the ore on the dumps at the time of Mr. Austin's visit would average five per cent nickel. The soil of the mountain carries as much as two per cent of the metal.

The nickeliferous areas are controlled by two companies, the Oregon Nickel Mines Co., and the American Nickel Mining Co. Mr. J. H. Winslow, of Glencoe, Ill., is president of the latter. This company has expended $80,000, it is said, in external improvements, among which may be mentioned a road to the top of Piney Mountain; a power plant at the site of the proposed reduction works consisting of a 300-horse-power Corliss engine and water-tube boiler; and buildings for various purposes. A furnace and other parts of a smelting equipment are stored at Riddle. No work has been done for about ten years.

OZOKERITE AND ASPHALTUM

Wax-like substances are said to occur near Ashland, Prineville, and Climax, while in the basin of the Nehalem River it is reported that sandstone impregnated with material of this sort has been found.

Asphaltum deposits are of reputed occurrence near Lake Alvord, southern Harney County, and near Drewsey, in this same county, upon the middle fork of the Malheur. In some of the coal veins of Coos County, interesting occurrences of asphaltum-like substances have been noted.

A controversy has long been waged in Oregon as to the nature of certain waxes found in considerable quantity in the sands of Nehalem beach, in Tillamook County. The regular shapes often possessed by some of these masses, together with the existence of markings upon them having the appearance of letters, has led to the hypothesis that the wax was once the cargo of a Spanish ship destined for the Spanish missions of the Pacific coast,—the vessel having been wrecked, it is supposed, near Nehalem Bay. The existence of a bee imbedded in one of the cakes, together with analytical data, and the general texture and aroma of the substance—all is sufficient evidence to the adherents of the wrecked ship hypothesis that the material is at least really beeswax.

Their opponents, however, contend that no vessel of a century or two ago could possibly have carried the quantity of wax known to have been quarried and sold from this place, and that furthermore, since the wax is found high up on the beach, and far away from the probable surf line of so recent a period, it is without the range of possibility that the deposit originated in this way. The opponents of the ship idea are inclined to assert that the substance is ozokerite, and adduce various reputed chemical analyses in support of their contention. They also emphasize the fact that sandstones saturated with ozokerite are reported from the basin of the Nehalem River. One controversialist is thoroughly familiar with the ozokerite deposits of Utah, and has seen every regular shape found at Nehalem—hieroglyphics and all—duplicated by natural processes in the Utah field. The existence of a bee imbedded in the wax is easily explained, they say, by assuming that upon some warm summer day, when the wax was soft and sticky, an unfortunate insect of that species perchance became entangled in it, and has so been preserved to the present time.

Investigations to determine the nature of the Nehalem wax were taken up in the University laboratory a year ago and carried nearly to completion under direction of the writer by Mr. W. T. Carroll. It has been shown in this work that the substance is not an ozokerite at all, but that it has all of the qualitative characters of a beeswax. It would seem that during its long period of exposure the wax has undergone a mild oxidation, whereby in its quantitative composition only does it differ from that of fresh beeswax. Diligent inquiry has failed to reveal a single chemical analysis worthy of the name which does not lead to the conclusion that this material is the true product of the bee.

The origin of the wax is as much a mystery as ever, since there is really no evidence that it ever came from a wrecked ship. It is quite

possible that wild bees at some time in the past have nested in the soft sandstone cliffs of the Nehalem and that because of a landslide, or even in the natural course of weathering, their stores of wax have been precipitated into the river and carried to the beach.

PETROLEUM AND NATURAL GAS

Oil seepages and other indications of the existence of petroleum are said to occur near Bay City, Tillamook County; at Vale, Owyhee, Westfall, and other places in Malheur County; upon the farm of W. A. Turnidge, six miles northwest of Willamina, Yamhill County; and upon the property of J. W. Lake, Olalla, Douglas County.

Prospecting for oil has been done at several places, the following having come to the notice of the writer: Mr. H. Hirschberg, of Independence, drilled to a depth of 986 feet three miles west of Independence, and obtained, in addition to gas and a small quantity of oil, a strong flow of salt water, which he will utilize in the manufacture of salt. Mr. Hirschberg will make another attempt to secure oil, as he believes indications fully justify it. A well at Newberg was abandoned at 1200 feet; another in Lincoln County reached a depth of of 800 feet; in wells at Troutdale, Springfield, Myrtle Creek, and St. Johns operations ceased at unreported depths, presumably without results.

Gas was obtained by Mr. Hirschberg, as mentioned above, and a well 227 feet deep near Ontario, Malheur County, furnishes sufficient gas to supply seven lamps for six hours or so at a time.

PLATINUM

This metal occurs associated with placer gold in the following places: The Hindman placers, junction of Pine and Camp creeks, Baker County; in Carson Channel, Camp Carson, Union County; Spanish Gulch placers, Wheeler County; in many of the beach mines of the coast; and in placers extending along a supposed "platinum belt" lying between the Galice and Waldo districts in Josephine County. During the past summer Dr. Ed. W. Mueller, in charge of the Sumpter smelter and the Standard Consolidated mine at Quartzburg, reported the existence of platinum in the Ruby vein of the Standard property.

The recovery of platinum heretofore has been undertaken only in a desultory way. The Hindman placer, mentioned above, saved about half an ounce at each clean-up, according to Lindgren. In

many of the placers of Coos and Curry counties, as well as in the beach mines as far north as Yaquina, platinum values are saved in a small way. In the "platinum belt" referred to above, some platinum has been saved for years, but doubtless many times the quantity saved has been thrown away through ignorance of its nature and value. At the present time the placer miners are fully alert in the matter, however, and where values exist which can be extracted at a profit it will be done. During the present year, the Waratah Minerals Co., said to be associated with the Welsbach Co., of Philadelphia, is making an effort to save the platinum of the Old Channel placers in the Galice district. Associated with the platinum in Southern Oregon are varying amounts of osmium and iridium, while rhodium and palladium have also been reported.

RARER MINERALS OF INTEREST

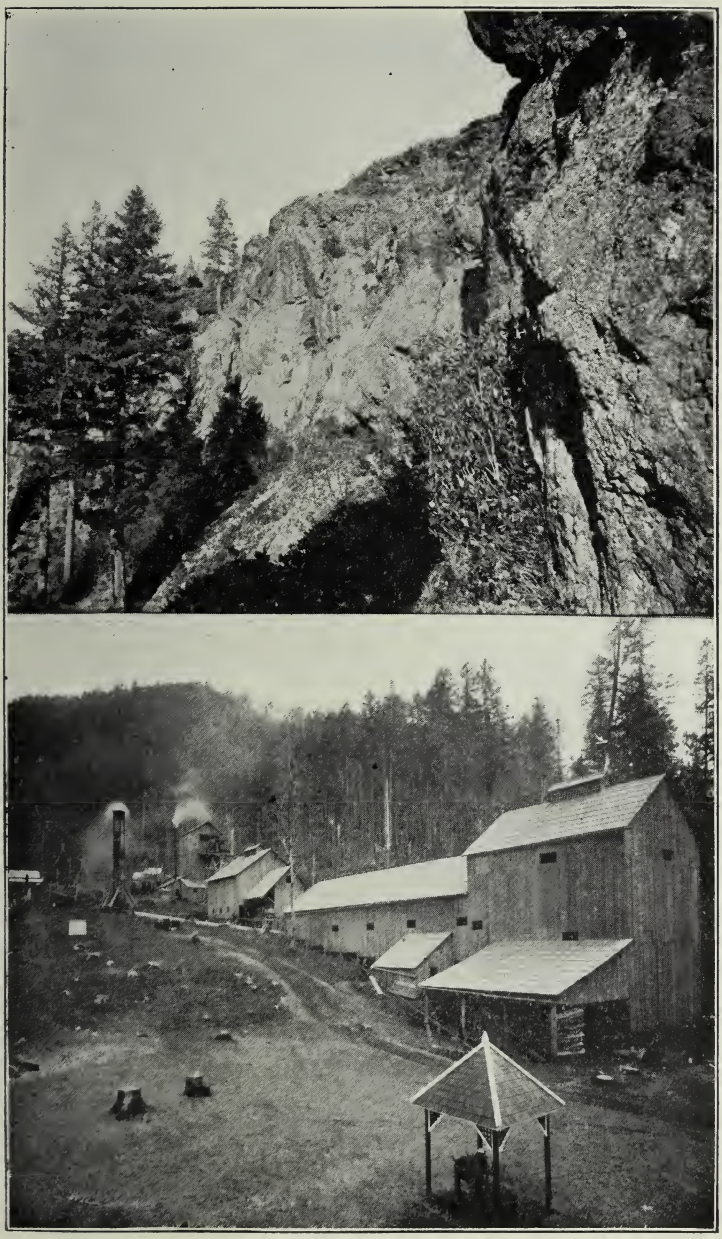
Diamonds—Small diamonds are reported from Harney County, the district in which they are found being forty miles from Burns.

Opals—Opals are found near Gold Hill mine, in the vicinity of Durkee, Baker County. They occur, according to Lindgren, in a yellowish-gray rhyolite tuff. The quarry has been opened by a cut 50 feet square and 30 feet deep.

A report has been received to the effect that opals are also found in large quantities upon Hay Creek, northern Gilliam county.

Sapphires, etc.—Locations have been filed upon all of sections 16, 17, and 21, in township 25, range 35 east, Harney county, for the "sapphires and other precious stones" carried by this land.

Josephenite—This mineral, a native alloy of nickel and iron, is found in small quantities upon Josephine Creek, southwestern Josephine County. An analysis of this interesting substance was made in the laboratory of the U. S. Geological Survey in 1892 by Mr. W. H. Melville, who gives the results of his work in the American Journal of Science, for June of that year, page 509. According to Mr. Melville the alloy contains 23.36 per cent of iron, and 60.47 per cent of nickel, from which he deduces the formula $Fe_5\ Ni_5$. It differs from meteoric iron in containing no phosphorus, and in giving no Widmannstaetten figures. It probably originates in an immense serpentine belt through which Josephine Creek has cut its channel. Specimens in the University collection have the appearance of irregular water-worn pebbles. They are black in color, but when polished or scratched appear like metallic iron or nickel.



CINNABAR OUTCROP AND REDUCTION PLANT, BLACK BUTTE QUICKSILVER MINING CO.

SALTPETER

This substance occurs in the marsh deposits of southeastern Oregon, and in quantities sufficient to justify extraction, it is said.

A very interesting occurrence is noted near Mt. June, southern Lane County, where a ledge of earthy material carrying large quantities of nitre is exposed. Claims have been staked by Mr. Elmer Doolittle and associates, of Cottage Grove.

SODA

Summer and Abert Lakes, Lake County, are said to be constituted of strong solutions of salt, potash, and soda, from which some soda has been obtained. No authentic information concerning the industry has reached the University, in spite of all efforts to get into communication with the interests concerned.

STONE

Stone of various kinds can be found widely distributed in the state, but unfortunately it has happened that in general the best deposits are not situated near the railroads or navigable streams, so that, for mere lack of transportation facilities, it is impossible to market much of it at the present time. The very magnitude of the matter of the occurence of stone has made it out of the question to inquire closely into it, but the material accumulated is given for what it is worth. The writer is much indebted to Mr. C. W. Washburne for data regarding a number of quarries. The paragraphs contributed by him are marked with an asterisk.

Baker County—According to Lindgren, limestone is found in large masses in the Eagle Creek Mountains, and near Huntington. In the Elkhorn Range, notably at Marble Creek, lenticular masses occur, but for the rest, limestone is found only in small quantities in in the districts visited by him.

Benton County—*One-half mile west of Monroe is a quarry from which stone was obtained for one of the buildings of the Oregon Agricultural College at Corvallis. The stone is a hard, bluish-gray sandstone with a partly crystalline cement of calcium carbonate. Judging from exposures at the quarry, it ought to resist weathering admirably, but it may be hard to work. The nearest railway station to the quarry is at Corvallis, 12 miles north, but with slight improvements in the channel of the Long Tom, an outlet might be

found by means of that stream and the Willamette to the Portland market.

*Opposite Albany, about a mile from the steel bridge, is a quarry of greenish-gray sandstone. Most of the rock quarried is yellow from weathering. It is compact, even grained, and easily worked. Many of the grains are surrounded by thin films of iron oxide, but the principal cement is calcium carbonate.

Curry County—*On the north side of Cape Blanco is a heavy bed of tawny yellow sandstone of rather fine and very even grain. It has a little iron or lime cement, but is quite compact, and probably makes a good building stone, quantities of it having been shipped to San Francisco for this purpose. From the quarry a little railway has been built to a precarious fair-weather anchorage about a mile distant. The quarry has been idle for several years.

Crook County—A volcanic tuff occurs along the Des Chutes River which can be hewn into shape with an axe, and which is used for fire places and other light building purposes.

Douglas County—The Whitsett limestone lentils, described by Diller, have served to some extent as a source of lime, and also have been worked in a small way for marble. The marble varies in appearance from a dark wine color to a grayish yellow. A full description of these lentils is given in the Roseburg Folio of the U. S. Geological Survey.

*Two and one-half miles north of Drain is a practically unlimited quarry of yellow sandstone. It is of excellent quality, having been put to a practical test by the Southern Pacific Co. in building bridge piers.

This quarry, it may be said, is in the Tyee sandstone,—a formation which deserves mention here as an important future source of good building stone. From its typical exposures at Tyee Mountain, 12 miles west of Oakland, Oregon, this stone extends northward in the Coast Range Mountains for an unknown distance. The sandstone cliffs along the Siuslaw River, especially Beech Rock, and Tilden Rock, are probably of Tyee sandstone. Most of the Coast Range south of the Umpqua River, in fact, is composed of the same rock. This sandstone presents unusual possibilities as a building stone because of its abundance, homogeneity, and freedom from fracture. It is usually in heavy, horizontal beds, with a few thin separations of shale. It presents but little variation in the whole distance from the Rogue River Mountains to the Siuslaw River, but it is most favorably exposed for exploitation along the Umpqua and Siuslaw rivers. The stone is compact, even-grained, micaceous, and varies

in color from yellow to gray and green. It is soft and easily worked, notwithstanding which it presents admirable resistance to weathering. The quarries at Pioneer, on the Corvallis and Eastern railroad, are probably a northern extension of the Tyee sandstone.

*Just north of Alca station, the Southern Pacific is working some extensive quarries of green volcanic tuff. This rock is too porous for piers or foundations, but is good in revetments, fills, etc.

Grant County—*In the north edge of Canyon City is a quarry of white stone which was largely used in rebuilding the business part of the city after its destruction by fire in 1898. The stone is a soft, white volcanic ash, easily worked and making a beautiful building stone. From its porosity, however, and the consequent ease with which it absorbs water, it may not long withstand the frosts of Eastern Oregon. The stone has no mineral cement, the particles being held together by interlocking, and by a paste of fine mud.

Jackson County—Sandstones are found near Eagle Point, and upon the course of the High Line Ditch, nine miles above Gold Hill. Marble exists in the mountains south of Gold Hill. A stone, said to be granite, was quarried near Ashland several years ago and shipped to Portland for building purposes.

Josephine County—Enormous deposits of marble are known in the southern part of Josephine County. As early as 1865, quarries were opened and marble taken to Ashland for monuments, but lack of roads into the wild, mountainous region in which the marble occurs, together, doubtless, with the fact that in quarrying the material in a small way only the partly weathered stone was accessible, made it expedient to abandon attempts to use the native product, and to ship from Vermont. At the present time, in the more easily accessible parts of the marble area, lime is being burnt for local demands. In the very heart of the district are the famous Oregon Caves.

Klamath County—Most of the county is covered with basalt, but a ledge of sandstone is reported in Alkali Valley near Bonanza.

Lane County—*On the south side of the Siuslaw River, near Point Terrace, is a quarry from which stone was obtained for the jetty at the mouth of the river. The rock is a compact sandstone of Eocene (?) age striking north 75° east, and dipping 13° southeast. The position of this quarry on tide water makes it very accessible, and large quantities of rock have been taken from it chiefly for use on the jetty. It has been extensively used in Florence and elsewhere

upon the Siuslaw as a foundation stone, for which purpose it is probably the best stone upon the tidewater of that river.

*At Lorane a quarry in gray sandstone has been opened and the stone used for fireplaces, foundations, etc. The rock is very firm and does not flake off when used for fireplaces. It is probably a local phase of the Tyee sandstone, but is somewhat harder, and is more thinly bedded than the typical rock at Tyee Mountain.

*Most of the quarries in the Willamette Valley are in a yellow Miocene sandstone that borders the valley upon both sides. An abandoned quarry in Fairmount, Lane County, is in this formation, as are also several quarries across the river from Salem; one quarry near the junction of Bear Creek and Mill Creek, about a mile south of Turner; two near Forest Grove; and doubtless several others. The stone in these quarries is of the same character, having a fine, even grain, and much fragmental and calcareous material. It has been used for light foundations, but is really unfit for building purposes of any kind. None of the quarries in this yellow sandstone near Eugene are worked at present, all of the foundation stone and most of the building stone for that vicinity coming from Nye's quarries just east of the abandoned Fairmount quarry, and probably a local variation of the same rock.

* The Miocene series of the Willamette Valley contains other stones that are of the highest order for building purposes. That from the Nye quarries mentioned above is one of these. It is a blue sandstone of fine and even grain, which is soft and easily dressed, but which can not be carved in intricate designs like the Pioneer stone. By the use of channeling machines, to the use of which the rock seems well adapted, blocks of almost any desired size might be extracted. As it is, blocks over five feet long are sometimes removed. The stone is said by Mr. Nye to have been subjected to crushing tests by the Southern Pacific Company, with very favorable results. Though probably one of the strongest sandstones in the valley, the Nye stone is doubtless weakened in quarrying by the use of powder. The manner in which it is put into buildings must also weaken it, as it is usually placed upright with the bedding plane outward in order to save work in dressing faces, and to show up the white clam shells which occur in frequent beds. This upright position of the sandstones makes it easier for flaking to occur, and places stress upon the stone in its weakest direction. It would be a saving for the builder, though not for the contractor, were all sandstones placed in position with their bedding planes horizontal. Practically all the stone removed from the Nye quarry is used in Eugene.

* Another good Miocene stone is that used in the piers of the steel bridge at Springfield. This is a strong tuffaceous sandstone, and was obtained from the river bank at the east end of the bridge. No stone has been removed from the place except for the bridge piers, but it is well adapted for general use.

* The same green volcanic tuff mentioned as occurring at Alca station, Douglas County, continues north for about eight miles to Cottage Grove, where it is quarried in Cemetery Hill, west of town, and is used in foundations. It has here a mottled yellow color, owing to oxidation, and is wholly unfit for the use which is made of it. It may be said in general that volcanic tuff, and volcanic ash, unless thoroughly cemented by some insoluble substance, make poor building stones because of their power of absorbing water, which causes flaking during frosts, and hastens decomposition at all times.

Lincoln County—One of the best known quarries in the state is located at Pioneer, on the Corvallis and Eastern railroad. The rock is a gray sandstone, soft and easily shaped, yet quite durable. Some of the beds are 10 feet thick, which makes it possible for blocks of great size to be taken out. Considerable quantities have been shipped to Portland and San Francisco. A complete equipment of quarry appliances is installed. No work was done during the past year.

Granite Mountain, section 29, township 9, range 8 west, is said to possess an excellent quality of granite in unlimited quantities. Wm. Toner and others, of Yaquina, are owners of the property.

Marion County—*Near Scott's Mills is a gray sandstone that is probably one of the best foundation stones of the Willamette Valley, its variable color making it undesirable for building purposes. It is dense and strong, and apparently less porous than most of the other Marion County sandstones examined. Owing to its distance from a railroad the stone has found only local use.

Two miles from Jefferson is a quarry of a dark-gray sandstone with a calcareous cement. It is fine-grained and easily carved. It was used for the Oregon stone in the Washington monument at Washington, D. C.

Granite Mountain is located upon the Corvallis and Eastern railroad 50 miles east of Albany. A complete quarrying outfit is in use. Two buildings at the Oregon Agricultural College, Corvallis, were constructed from this granite.

Multnomah County—*At Montavilla, five miles north of Portland, is a quarry in dark igneous rock,—probably a basic andesite,—from which stone is shipped throughout the Willamette Valley for

use chiefly as tombstone bases. As put upon the market it shows various shades of brown, due to varying degrees of oxidization, but it is possible to obtain single blocks of a uniform color. It is a beautiful building stone and is used in some of the recently built Portland residences. The stone is hard, dense and strong, but difficult to work on account of its brittleness. It breaks with a slightly conchoidal fracture. Blocks three or four feet square have few seams, either to aid or hinder the stone cutter. It is undesirable for exterior use on account of the rapidity with which it weathers. It may be said in general that all the igneous rocks of Oregon except those containing quartz,—commercially known as "granites",—will give but poor resistance to the elements. Most of the sandstones are better in this respect.

Polk County—*About three miles west of Dallas is an extensive exposure of rock that has been described under *Cement*. It seems to be an excellent stone for building purposes as well, however, for it is described as having a beautiful blue color and fine texture, as being durable and strong and capable of taking a high polish. Gravestones made from this stone 50 years ago are said to give evidence as to the weather resisting qualities of the stone. The Dallas County court house is built from it. A spur from the railroad to Falls City can be built to this quarry at slight cost.

Tillamook County—Plenty of sandstone and granite for building purposes is reported from the vicinity of Bay City.

Union County—Rhyolitic lavas, said to be very fine for building, are reported from LaGrande. From Elgin, building stone undefined in character, is reported "in any quantity."

Wallowa County—Limestone is reported from the vicinity of Fruita.

At Lostine the Lostine Lime and Marble Co., O. J. Poley, manager, quarries limestone for burning lime.

It may be said in a general way that the resources of this county, in the way of building stone of all kinds, are very great.

Washington County—Near Hillsboro the J. G. Boos quarry has been in operation for about four years. The rock is described as being "both sandstone and granite," and to consist of "large boulders of from 20 to 30 tons." The product is sawed for building purposes. Output for 1903, 3000 tons.

Yamhill County—From Gopher, this county, a stone for road metal is mentioned which is of interest. To quote from the informant: "It is put on the roads as taken from the quarry, and worked over with hammers afterward. With about two years exposure the

surface melts and makes a track surface almost like cement. On some portions of the road where it was applied 15 years ago it is now in fine condition for both summer and winter travel, and that without any repairs."

USES OF BASALT

*Basalt is frequently used as a foundation stone in Oregon. The same objection may be made to it that was made to the Montavilla stone, namely, that it will not resist the weather. The finest grained basalts, which are usually somewhat glassy upon fresh fracture, are the most durable, but unfortunately are as a rule cut up by a multitude of cracks, so that large blocks cannot be secured. One of the best basalts examined is that quarried in the southern edge of Silverton, Marion County, and used in the foundations of the mills and stores of that city. Basalt, especially when in large columns, makes artistic fences, and its usefulness for this purpose is not impaired by the slight crumbling which it undergoes. But its main use in Oregon is for road metal. When crushed and screened it makes excellent macadam, being much better for this purpose than any other rock in western Oregon.

SALT

Reliable information concerning the salt industry in southeastern Oregon has not been available for this work. In Lake County, numerous salt marshes and salt lakes are said to exist, many of them fed by salt springs. In summer the solutions are concentrated *in situ* by solar heat, and the salt is then obtained by simply piling it up and hauling it away. One such marsh is reported to have yielded over 400,000 pounds of salt in 1902, and to have been capable of producing as much more. It is said that three men can pile up 100,000 pounds of the material in a week. Filings have been made upon a number of marsh lands for the purpose of working their salt deposits.

Salt springs are known in Jackson County and in Douglas County, but are not utilized at present.

Three miles west of Independence, Mr. H. Hirschberg obtained a float of salt water at a depth of 962 feet, while sinking for oil. Upon analysis the salt is shown to be very pure. It is Mr. Hirschberg's intention to install evaporating apparatus and to put the product upon the market.

ZINC

The zinc minerals of the state occur altogether in association with the "base" ores of gold and silver. So far as known at the present time there are no mines in Oregon yielding ores which would pay if worked for their zinc content alone.

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